OKI

SEMICONDUCTOR SHORTFORM CATALOGUE

November 1996

http://ourworld.compuserve.com/homepages/rob_oee/

Submicron Factory in Miyazaki, Japan

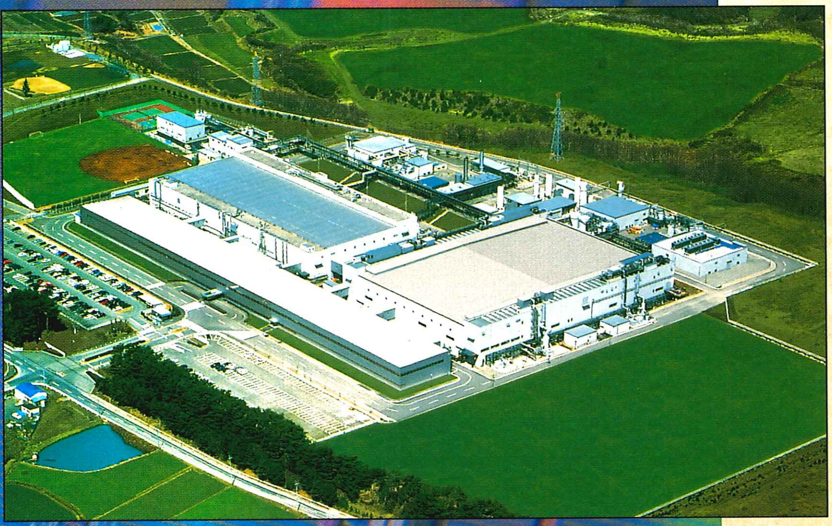
Many thanks for your interest in our semiconductor products. This catalogue contains a summary of our standard product range including available devices and devices under development to be introduced shortly. Please be so kind as to contact your nearest OKI sales office or your local OKI distributor for availability dates.

If you can´t pinpoint the right device for your specific application please contact us for a consultation.

OKI is permanently working on the design of new products and rigorously invests in R&D to come up with new memory and logic LSI technologies. The Company´s semiconductor production facilities in Japan and overseas are of course ISO9002 certified.

OKI is not only a supplier of standard semiconductors, moreover, it has established significant resources for semi-and full custom chips all the way up to board level and complete system solutions. We make it work!

OKI ELECTRIC EUROPE GmbH


Submicron Factory in Miyagi, Japan

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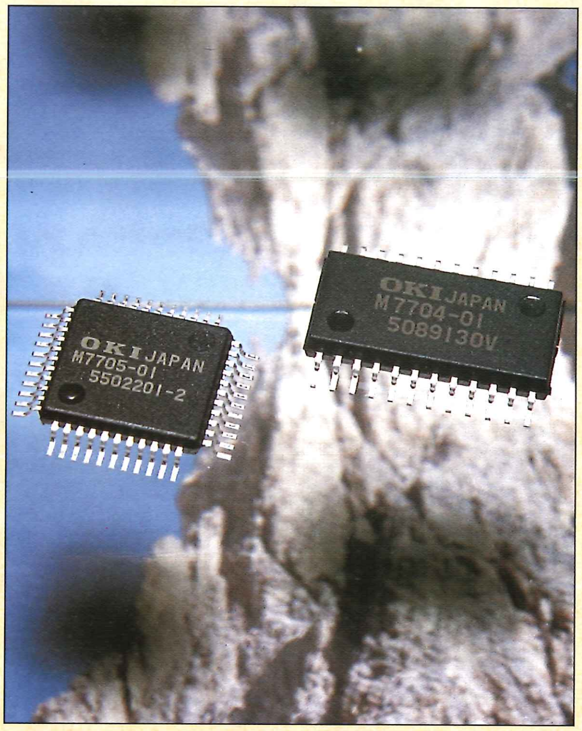
WIRELESS LAN BASEBAND CONTROLLER

The WLAN Baseband Controller MSM7730 (.XI) is a unique device providing all necessary functions to realise a IEEE802.11* compatible Wireless LAN card in conjunction with a radio, processor and buffer memory. It is designed to suit both stations and access points and supports the PCMCIA 2.1 compliant interface with 16-bit data transfers. Implemented on-chip is a combined radio modem designed for 1Mbps FSK and 2Mbps 4FSK data, while an external modem port allows connection of modems for direct sequence, infrared and higher speed physical layers. A radio interface to a frequency hopping type radio provides antenna select, power control, synthesiser programming and more. A low level communication protocol is hardware implemented reducing software overheads. A number of high-level protocol and management functions are provided by software designed to be run on a low cost processor. This software and the MSM7730 together provide a complete solution for IEEE802.11. The processor interface supports 80C86 and 80C186 families as well as the V30 and V53. Memory interfaces include a multiport memory controller for local shared memory (32kW for stations, 128kW for access points) as well as an EEPROM interface to download host configuration data, and for the storage of non-volatile card parameter data. The low profile 144-pin TQFP package and combined +3V/+5V operation allow implementation in PCMCIA Type II cartridges. The .XI is superior to equivalent devices because it features efficient speed response and data accuracy leading to higher throughput. Further, it integrates an efficient interface between the system and application software drivers by providing a double level hardware buffer, again increasing throughput rates, whilst reducing software overheads and memory consumption.

* Draft Standard IEEE802.11 D5

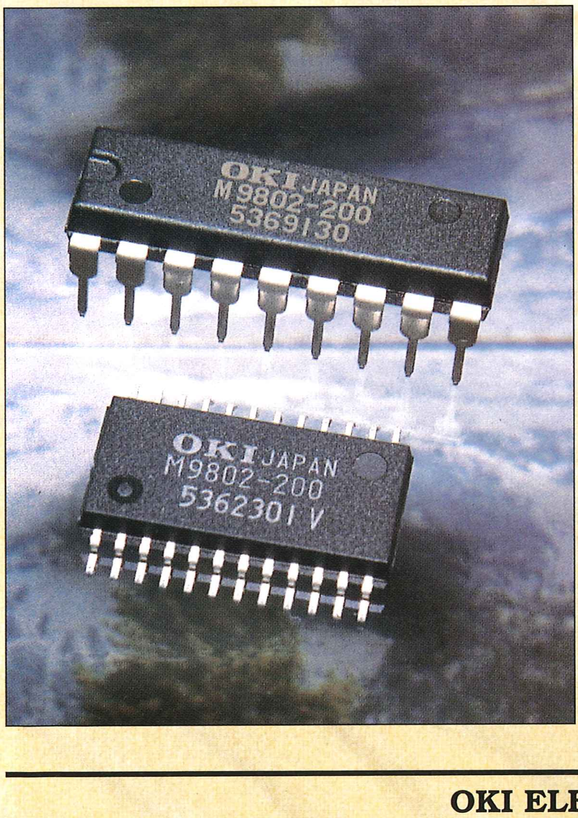
TWO-CHANNEL PCM VOICE CODEC

The two-channel MSM7704 has been developed using a finer technology which allows to make smaller dies and consequently put more than one device into the conventional 24-pin SOP. The small package containing two Codecs should be of great interest to the designers of portable phones where board space is premium. With a supply voltage range of 2.7 to 3.8V, the MSM7704 addresses 3V handset designs. It comes in three ITU-T G.711 compatible versions, selectable μ-Law or A-Law (MSM7704-01), μ-Law only (MSM7704-02) and A-Law only (MSM7704-03). All three variations consist of pulse code modulated coders and decoders plus PCM line filters. Data rates include the range from 64 to 2048 kHz in conventional intervals while the sampling clock is 8 kHz. Low circuit noise is achieved by means of switched capacitor filters while analog and digital supply rails are internally separated. An internal precision voltage reference is included as is a full auto-zero circuit. Crosstalk interferences are minimised as a result of independent operation of transmit and receive channels (transmit channels are individually level adjustable). MSM7704 uses two single analog outputs with an impedance of 1.2kOhms min. Owing to the single-rail supply the power down consumption rates no more than 0.03mW (max.), while 8.5mA current (typ. at 3V) are consumed during operation. All versions are available in a 20-pin shrink DIP or a 24-pin SOP, with an operating temperature range of -30 to +85°C. Also in the offer now, a 4-channel Codec, the MSM7705 for 5V operation.



SPEECH SYNTHESISER WITH 4-MEGABIT ROM

OKI Electric has launched a single chip ADPCM speech synthesiser with probably the world's largest internal ROM size of 4 Megabits. With this capacity fully used, a maximum playback time of 4.3 minutes is possible. It also provides many extras, including 4-bit ADPCM and 8-bit PCM reproduction plus melody generation. Furthermore, echos, beep tones, fade out and random playback of phrases can be generated. By means of mask bonding, controller or stand-alone modes are available, while the controller mode allows both parallel or serial host interfaces. Integrated on-chip is an edit ROM function by which means it is possible to define complete sentences for playback by applying only a single address. In total, 127 phrases can be stored, while 128 sentences each consisting of eight phrases can be preset in the ROM header to allow speech output upon applying a single address to minimise host interventions. Sampling frequencies are available from 4.0 to 32kHz. Maximum speech quality is assured by an internal 12-bit DAC and low-pass filter (-40 dB / octave). With a supply voltage range of +2.7 to 5.5V, the synthesiser requires an active current of typically 4mA at +3V or typically 6mA at +5V. MSM6658A comes in a 24-pin SOP. For speech code development, a PC based system is provided. MSM6658A is the largest in a family of ROM speech synthesisers ranging from 288 Kilobit to 4 Megabit internal storage capacities. All devices feature the same specifications with the only exception of their individual ROM size.



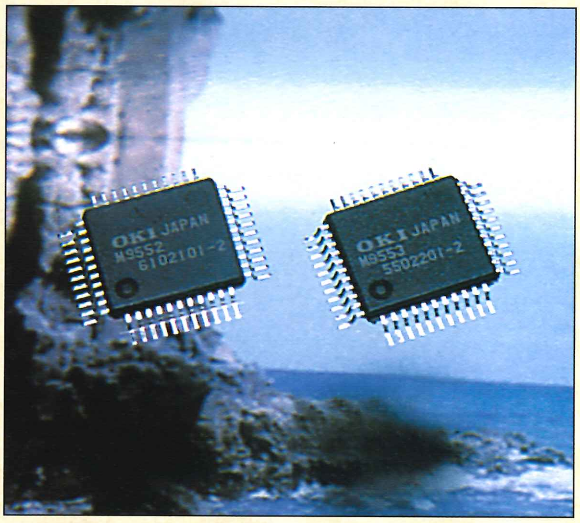
PCM SPEECH PLAYBACK FROM INTERNAL ROM

These new ROM speech synthesisers differ from other OKI synthesiser products in that they do not use OkiADPCM but PCM reproduction. Two methods are selectable, linear 8-bit PCM or non-linear 8-bit OkiPCM. The latter is a refined algorithm and provides a quality comparable with 10-bit linear PCM. The selection will be made using the AR203, a PC based development system which also allows the creation of the speech code to be masked on the internal ROM. MSM9802 comes with 512Kbit, MSM9803 with 1Mbit and MSM9805 with 2MBit ROM all addressing multi-purpose applications requiring high speech and sound fidelity as much as simplicity in use. In fact, only a few external components and a power amplifier (or transistor) are required to establish a high quality speech playback unit. Both manual switch and MCU control modes are available. Integrated on-chip is an edit ROM function by which means it is possible to define complete sentences for playback by applying only a single address. Additional functions include MCU or stand-alone interfaces, random playback (in stand-alone), and up to 63 phrase channels. The chips can be clocked using either a RC network at 256kHz or a 4.096MHz crystal, while the MCU control mode requires the crystal. Built-in are a 10-bit DAC and a low-pass filter. Selectable sampling frequencies are 4.0, 5.3, 6.4 and 8kHz with RC oscillation and further 10.6, 12.8 and 16.0kHz with a crystal. With the given data width of 8-bit, 16 seconds playback at 4kHz sampling with MSM9802, 32 seconds with MSM9803 and 64 seconds with MSM9805, respectively are achieved. Further, these parts convince by their wide power supply ranging from 2.4 to 5.5V while the maximum current consumption lies in the order of 10mA, and 10µA in standby mode. The package offer includes an 18-pin DIP, 24-pin SOP and 30-pin SSOP for all ROM size versions with industrial operating temperature range. A 2MBit OTPROM version, the MSM98P05 is under development.

DARC/SWIFT/FMSS FM MULTIPLEX DEMODULATOR

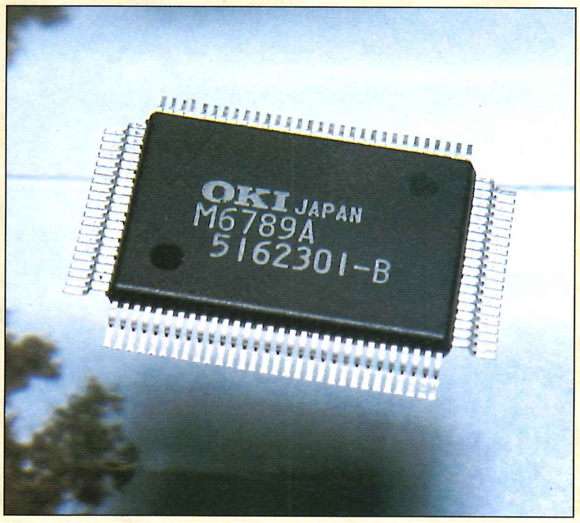
MSM9552 is a radio data decoder compatible with DARC (DAta Radio Channel), FMSS (FM Subcarrier Service) and SWIFT (System for Wireless Infotainment Forwarding and Teledistribution), the European equivalent, currently under draft version. MSM9552 demodulates FM character multiplex signals to acquire digital data. Baseband signals at ordinary FM broadcasting frequencies are multiplexed with 16-kbps digital data which are L-MSK modulated at 76kHz. MSM9552 includes a SCF bandpass, block and frame synchronisation circuit, error correction and more on-chip. It supports international frame methods A, B and C. An data acquisition system merely requires the connection of an FM tuner, a microcontroller and memory for temporary data storage. The device is equipped with essential functions allowing adaptation to various requirements of future FM multiplex broadcasting services by means of MCU software modification. MSM9552 is offered in a small 44-pin QFP, operates at 5V with a maximum current of 25mA. MSM9553 is the 3V version drawing 22mA.

* DARC is a registered trademark of NHK Engineering Service.



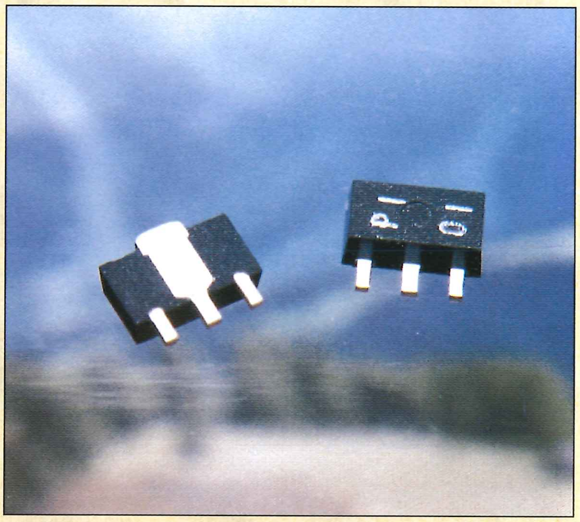
SPEECH PROCESSOR FOR AN HOUR RECORDING

With MSM6789A, Oki Electric has introduced a speech processor using the Sub Band Coding algorithm, OkiSBC, for data reduction. By this means, bit-rates from 7.5 to 16Kbps are achieved whilst providing a high degree of intelligibility. A selectable silence detection function can reduce the bit-rate even further. MSM6789A provides two memory interfaces, one is for 1-, 4- and 16 Megabit dynamic RAM chips, the other for OKI Electric's 4- and 8 Megabit serial voice registers. Both interfaces envelop an addressing capacity of 32 Megabits maximum. In addition to this, up to 4-Megabit voice ROM can be connected for fixed outgoing messages, such as time stamps. Fully configured and assuming a bit-rate of 10Kbps the recording time is about one hour. In its 100-pin QFP, the MSM6789A incorporates 12-bit ADC, 12-bit DAC, a low-pass filter (-40dB/oct.) and amplifiers. Operated with a microcontroller, the number of recording channels can be defined by software. In the stand-alone mode, 63 channels are provided under switch control. With MSM6789L comes a power-saving 3V version in TQFP package, which in conjunction with serial registers forms a 3V solid state recording system. The primary application is for telephone answering machines demanding long recording times.

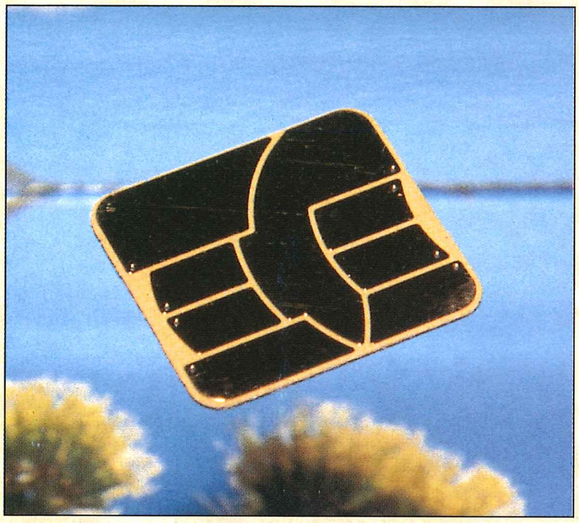


GaAs POWER FET FOR 3V-SYSTEMS

OKI Electric's gallium arsenide power FET KGF1638 offers the industry's first 3.4V solution such as for GSM Class-4 RF units with 2W power output. The minimum output power provided by KGF1638 at 850MHz is 33dBm at 3.4V and 35dBm at 4.7V. Drain efficiency is typically 70% with a maximum drain current of 4.5A. Designed to be powered by a 3V NiCd.NiMH 3-cell, KGF1638 is offered in a three-pin plastic package which resembles a SC62(SOT89-type) encapsulation. In conjunction with the company's KGF1254B (16dBm medium power amplifier), MBF9321 (GSM Saw Filter), KGF1633 (26dBm driver amplifier) and KGF1638 a 3V GSM class 4 RF unit can be realised. Further 3.4V power GaAs FET products from OKI include KGF1637 (31.5dBm min.) in plastic mold and KGF1607 (31.5dBm min.) and KGF1608 (33dBm min) both in ceramic molds.

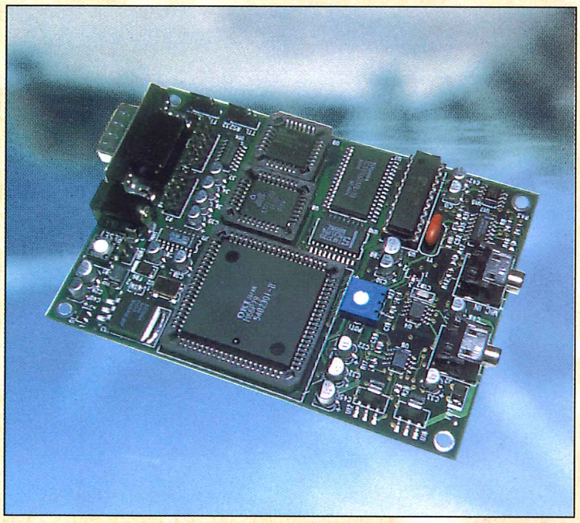


Highlights



SMARTCARD MCU FOR GSM-SYSTEMS

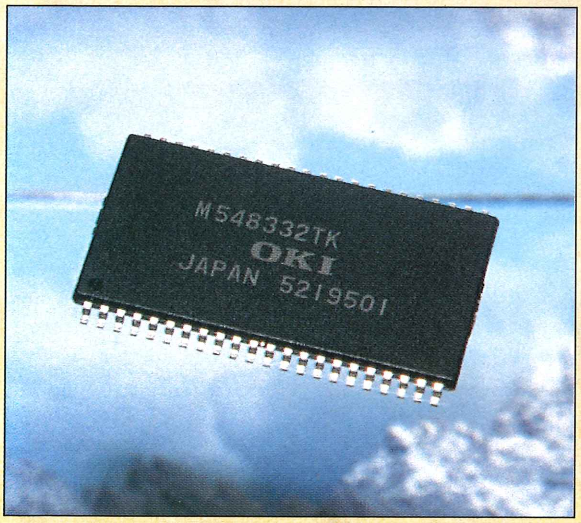
Available in chip form or as COB assembly, the MSM62880 is a card controller with 8-bit architecture designed for GSM applications. Able to operate off either 3V or 5V supply rails, the device is also equipped with a power saving 'sleep mode' which will power down the chip during quiet periods and wake it up once communication has been resumed, saving critical battery power. The MSM62880 integrates 12228 bytes of program ROM, 8192 bytes of EEPROM, 380 bytes of RAM, a serial I/O and an error correction circuit. The data EEPROM is configured with 256 pages of 32 bytes each and allows for page writing of a maximum 32 bytes at a time without interrupting the CPU. The implementation of EEPROM permits remote applications such as diagnostic and testing, electronic purse and other services. MSM62880 features a powerful set of 294 instructions and is operable at a maximum clock frequency of 10MHz executing at 400ns minimum cycles. With MSM62885 comes an on-chip modular coprocessor for the implementation of public key cryptography.



VOICE RECOGNITION PROCESSOR

The MSM6679 Voice Recognition Processor, VRP, is an unique single-chip device that is capable of both, speaker-independent (SI) and speaker dependent (SD) recognition. In addition, it allows solid-state recording and playback, the playback of sounds and the controlling of an external OKI speech synthesiser. Further on-chip functional blocks include a flexible memory controller, flash interface, analog signal conversion, synthesiser interface, PWM sound outputs, plus parallel and two serial command interfaces. In its speaker-independent mode, the VRP contains vocabulary templates in its internal ROM or external memory, typically Flash. The algorithm is highly noise tolerant achieving a recognition accuracy of >95% in its designated operation environment. In its speaker-dependent mode, the VRP can be trained to recognise up to 61 words as defined by the user in external RAM. Each utterance can be enrolled and adaptive template updating be applied to drive accuracy towards 100 percent. Upload to host and download of templates in conjunction with Flash or RAM is provided.

Pictured: Serial Demonstration Board for the PC.



3.3 MEGABIT FIELD MEMORY

With its 0.45µm CMOS structured MSM548332, Oki Electric offers a high performance 3.3 Megabit field memory primarily for PAL video systems, such as TV, VTR and camcorders plus multimedia PC products. Unlike FIFO type field memories, this device was designed as a line-by-line access type with a memory area matrix that is an exact representation of a picture field. Organised in 290 rows by 960 columns by 12 bits, it provides a 4-bit deep chroma (C) area and an 8-bit deep luminance (Y) area. Supported among other functions are: asynchronous read/write, line bit access, random initial access, line self-refresh, write mask and a set of simplified reset functions. The device features self-refresh and therefore appears to the designer completely static. MSM548332 comes in three versions that differ by their access times, 25, 30 and 50ns. Thanks to its 3.3V power supply, the field memory requires a maximum active current of only 50mA and 10mA in standby (for the highest speed version). The small sized 44-pin TSOP package helps saving premium board space. Two further, functionally similar field memories from OKI are available for NTSC standard video products.

OLMS63K FAMILY 4-BIT MCUs

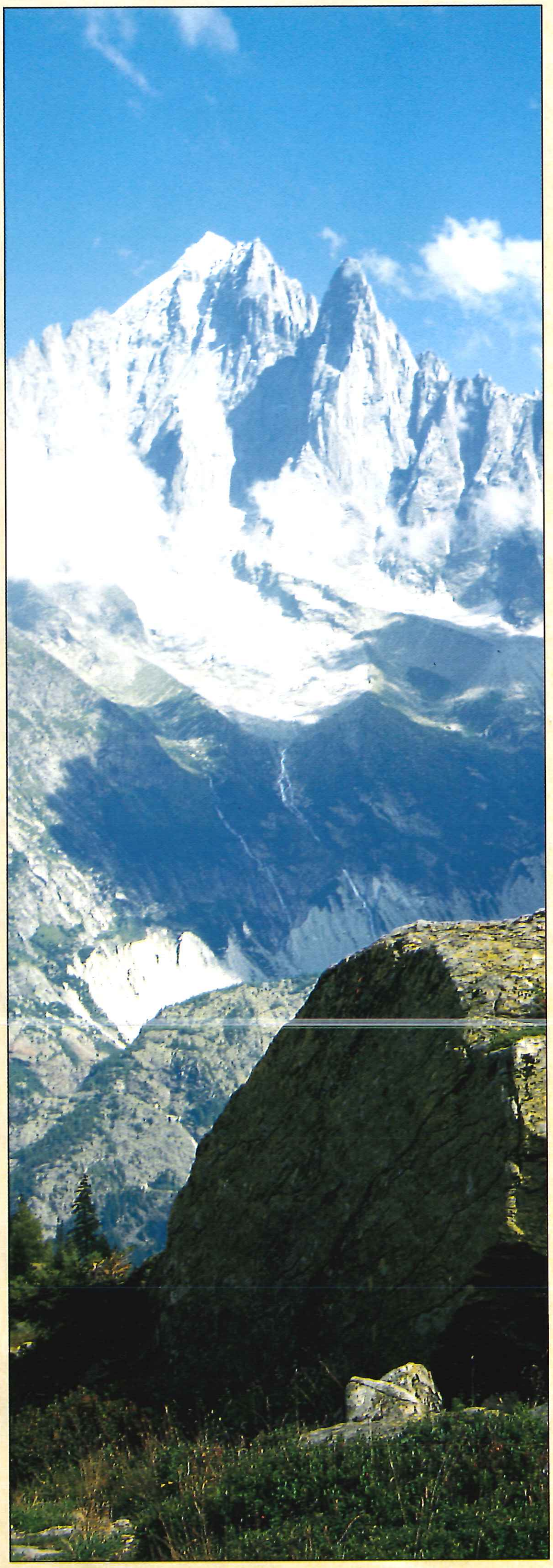
PART NUMBER	PACKAGES	FUNCTION
MSM63182-XX*	128-QFP/CHIP	4.064KW ROM, 384N RAM, 512 SEG LCD, 36 I/Os, 2MHz
MSM63184-XX*	128-QFP/CHIP	8.160KW ROM, 640N RAM, 640 SEG LCD, 44 I/Os, 2MHz
MSM63188-XX*	176-QFP/CHIP	16.352KW ROM, 3584N RAM, 1024 SEG LCD, 56 I/Os, 2MHz
MSM63P180*	176-QFP	16.384KW OTP, 3584N RAM, 1024 SEG LCD, 56 I/Os, 2MHz
MSM63238-XX*	80-QFP/CHIP	16.384KW ROM, 1024N RAM, POCSAG DEC, 50 I/Os, 2MHz
MSM63P238*	80-QFP	OTP-VERSION OF MSM63238

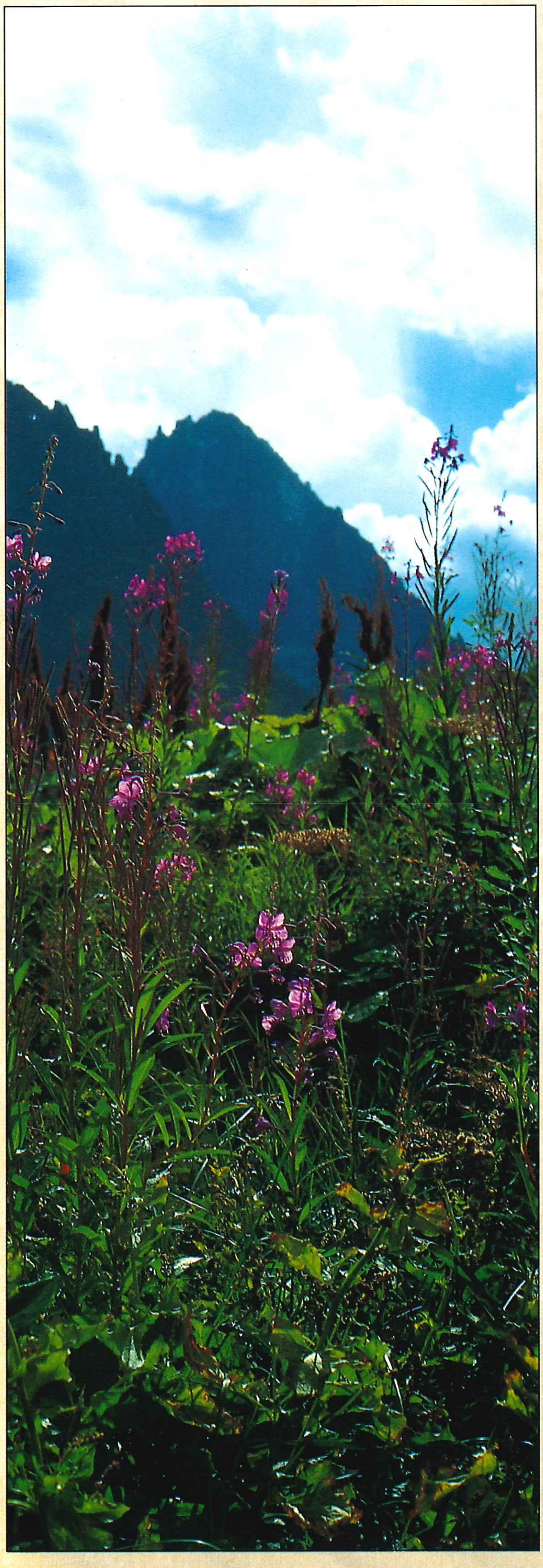
OLMS64K FAMILY 4-BIT MCUs

PART NUMBER	PACKAGES	FUNCTION
MSM64152A-XX	60-QFP/CHIP	1.5KBYTE ROM, 128N RAM, 104-SEG LCD DRV, MELODY
MSM64153A-XX	80-QFP/CHIP	3KBYTE ROM, 160N RAM, 144-SEG LCD DRV, MELODY
MSM64155A-XX	100-QFP/CHIP	4KBYTE ROM, 256N RAM, 240-SEG LCD DRV, MELODY
MSM64P155*	100-QFP	OTP-VERSION OF MSM64152A/64153A/64155A/64158A
MSM64158A-XX	64-QFP/CHIP	2KBYTE ROM, 128N RAM, 144-SEG LCD DRV, MELODY
MSM64162-XX	64-QFP/80-QFP/CHIP	2KBYTE ROM, 128N RAM, 80-SEG LCD DRV, 2-CH RC OSC
MSM64162D-XX	64-QFP/80-QFP/CHIP	2KBYTE ROM, 128N RAM, 80-SEG LCD DRV, 1.5-CH RC OSC
MSM64164C-XX	80-QFP/CHIP	4KBYTE ROM, 256N RAM, 120-SEG LCD DRV, 2-CH RC OSC
MSM64P164	80-QFP	OTP-VERSION OF MSM64164C
MSM64167-XX	80-QFP/CHIP	4KBYTE ROM, 256N RAM, 108-SEG LCD DRV, 12-BIT DUAL SLOPE
MSM64169-XX*	128-QFP/CHIP	8KBYTE ROM, 512N RAM, 240-SEG LCD DRV, 12-BIT DUAL SLOPE
MSM64P169*	128-QFP	OTP-VERSION OF MSM64169
MSM64172-XX	56(S)-QFP/CHIP	2KBYTE ROM, 128N RAM, 92-SEG LCD DRV
MSM64431-XX	24-DIP/24-SOP	1KBYTE ROM, 64N RAM, ADC, 4.2MHz
MSM64481-XX	60-QFP	2KBYTE ROM, 128N RAM, 512B EEPROM, 80-SEG LCD, 500kHz
MSM64Q481	60-QFP	OTP-VERSION OF MSM64481

Suffix "-XX" denotes mask code.

* Under development





8-BIT INTEL TYPE MICROCONTROLLERS

PART NUMBER	PACKAGES	FUNCTION
MSM83C154S-XX	40-DIP/44-(T)QFP/44-QFJ	256BYTE RAM, 16KBYTE ROM, 1-20MHz, 125°C**
MSM83C154S-XX	40-DIP/44-(T)QFP/44-QFJ	256BYTE RAM, ROM-LESS, 1-20MHz, 125°C**
MSM85C154H	40-CERDIP	PIGGYBACK VERSION OF MSM83C154X

** Various operating ranges available.

OLMS65K FAMILY 8-BIT MCUs

PART NUMBER	PACKAGES	FUNCTION
MSM65512A-XX	40-DIP/44(64)-QFP/44-QFJ	8KBYTE ROM, 256BYTE RAM, 32I/Os, 10MHz, 400ns
MSM65P512A	40-DIP/64-QFP/44-QFJ	OTP-VERSION OF MSM65512A
MSM65514-XX	64-SDIP/64-QFP/68-QFJ	16KBYTE ROM, 384BYTE RAM, 56I/Os, 10MHz, 400ns
MSM65P514	64-SDIP/64-QFP/68-QFJ	OTP-VERSION OF MSM65514
MSM65516-XX	64-SDIP/64-QFP/68-QFJ	32KBYTE ROM, 640BYTE RAM, 52I/Os, 10MHz, 400ns
MSM65P516	64-SDIP/64-QFP/68-QFJ	OTP-VERSION OF MSM65516
MSM65522-XX	42-SDIP/44-QFP/44-QFJ	8KBYTE ROM, 384BYTE RAM, 36I/Os, 10MHz, 400ns
MSM65P522	42-SDIP/44-QFP/44-QFJ	OTP-VERSION OF MSM65522
MSM65524A-XX	64-SDIP/64-QFP/68-QFJ	16KBYTE ROM, 384BYTE RAM, 52I/Os, 10MHz, 400ns
MSM65P524A	64-SDIP/64-QFP/68-QFJ	OTP-VERSION OF MSM65524A
MSM65344A-XX	80-QFP	12KBYTE ROM, 384BYTE RAM, 48I/Os, ADC, LCD, 10MHz, 400ns
MSM65352B-XX	64-QFP	8KBYTE ROM, 256BYTE RAM, 27I/Os, ADC, LCD, 10MHz, 400ns
MSM65353-XX	100-QFP	16KBYTE ROM, 384BYTE RAM, 50I/Os, ADC, LCD, 10MHz, 400ns
MSM65354-XX	100-QFP	24KBYTE ROM, 640BYTE RAM, 50I/Os, ADC, LCD, 10MHz, 400ns
MSM65355-XX	100-QFP	16KBYTE ROM, 640BYTE RAM, 65I/Os, ADC, LCD, 10MHz, 400ns

OLMS66K FAMILY 8/16-BIT MCUs

PART NUMBER	PACKAGES	FUNCTION
MSM66207A-XX	64-SDIP/68-QFJ	32KBYTE ROM, 1024BYTE RAM, 48I/Os, ADC, 10MHz, 400ns
MSM66P207	64-SDIP/68-QFJ	OTP-VERSION OF MSM66207A
MSM66507-XX	84-QFJ	48KBYTE ROM, 1536BYTE RAM, 59I/Os, ADC, 32MHz, 125ns
MSM66P507	84-QFJ	OTP-VERSION OF MSM66507
MSM66509-XX	128-QFP	64KBYTE ROM, 2048BYTE RAM, 92I/Os, ADC, 32MHz, 125ns
MSM66P509	128-QFP	OTP-VERSION OF MSM66509
MSM66589-XX*	128-QFP	96KBYTE ROM, 4096BYTE RAM, 94I/Os, ADC, 16MHz, 125ns
MSM66P589*	128-QFP	OTP-VERSION OF MSM66589
MSM66Q589*	128-QFP	FLASH-VERSION OF MSM66589

OLMS66K FAMILY 8/16-BIT MCUs FOR MEDIA

CD MD
MO FD

PART NUMBER	PACKAGES	FUNCTION
MSM66586-XX	100-TQFP	48KBYTE ROM, 2048BYTE RAM, 80I/Os, ADC, 20MHz, 100ns
MSM66587-XX	100-TQFP	64KBYTE ROM, 2048BYTE RAM, 80I/Os, ADC, 20MHz, 100ns
MSM66P587	100-TQFP	OTP-VERSION OF MSM66586/MSM66587
MSM66Q587	100-TQFP	FLASH-VERSION OF MSM66586/MSM66587

NOTICE: Please also inquire about ROM-less versions. Suffix "-XX" denotes mask code.

* Under development

CPU & I/O

8/16-BIT MICROPROCESSORS

PART NUMBER	PACKAGES	FUNCTION
MSM80C85AH	40-DIP/44-QFP/44-QFJ	8-BIT CPU, 5MHz, DYNAMIC
MSM80C86A-10	40-DIP/56(L)-QFP/44-QFJ	16-BIT CPU, 10MHz, STATIC
MSM80C88A-10	40-DIP/56(L)-QFP/44-QFJ	8-BIT CPU, 10MHz, STATIC

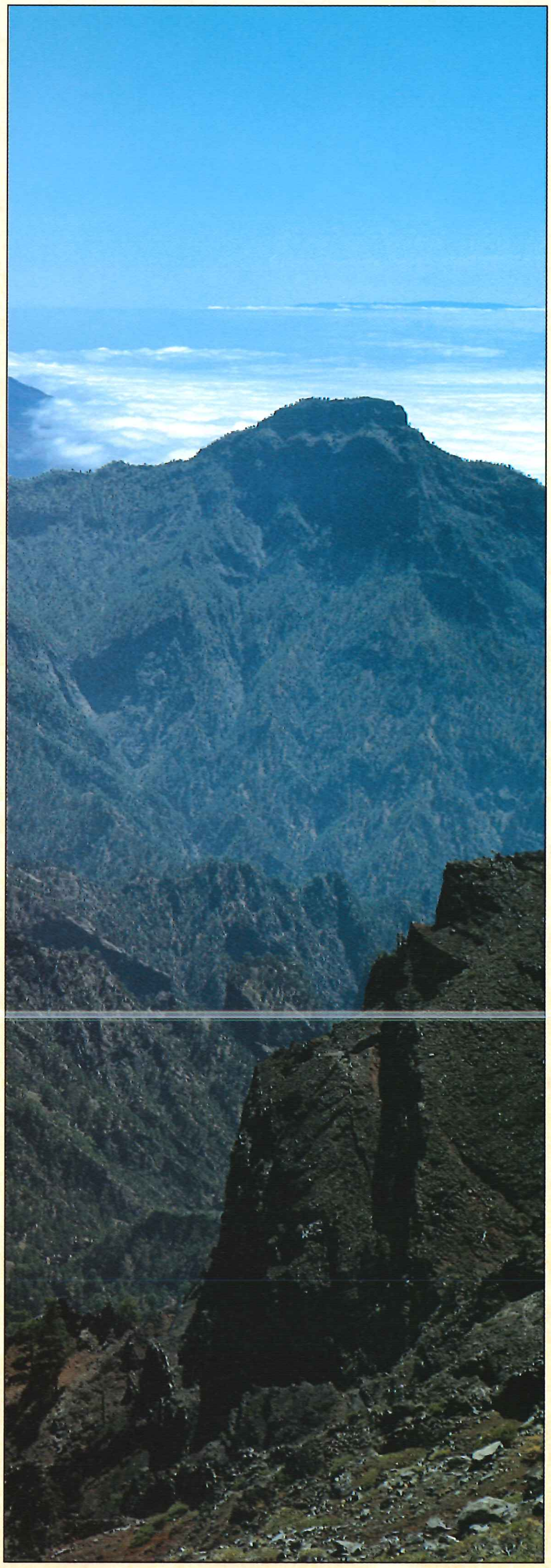
I/Os & PERIPHERALS

PART NUMBER	PACKAGES	FUNCTION
MSM6782-01	8-DIP/8-SOP	REAL TIME CLOCK, 3V, SERIAL INTERFACE
MSM6242B	18-DIP/24-SOP	REAL TIME BUS CLOCK
MSM62X42B	18-DIP/24-SOP	REAL TIME BUS CLOCK/INTERNAL XTAL
MSM6542-1	18-DIP/20-SSOP	REAL TIME CLOCK/ALARM (Intel I/F)
MSM6542-2	18-DIP/20-SSOP	REAL TIME CLOCK/ALARM (Motorola I/F)
MSM6542-3	24-DIP/24-SOP	REAL TIME CLOCK/ALARM (Both I/Fs)
MSM81C55-5	40-DIP/44-QFP/44-QFP	256BIT x 8 SRAM, TIMER & I/O
MSM82C37B-5	40-DIP/44-QFP/44-QFJ	PROGRAMMABLE DMA CONTROLLER
MSM82C43	24-DIP/24-SOP	I/O PORT EXPANDER
MSM82C51A-2	28-DIP/32-SSOP/28-QFJ	USART
MSM82C53-2	24-DIP/32-SSOP/28-QFJ	PROGRAMMABLE INTERVAL TIMER
MSM82C54-2	24-DIP/32-SSOP/28-QFJ	PROGRAMMABLE INTERVAL TIMER
MSM82C55A-2	40-DIP/44-QFP/44-QFJ	PROGRAMMABLE PERIPHERAL I/F
MSM82C59A-2	28-DIP/32-SSOP/28-QFJ	8-BIT INTERRUPT CONTROLLER
MSM82C84A-2	18-DIP/20-QFJ/24-SOP	16-BIT CLOCK GENERATOR
MSM82C88-2	24-SOP/20-QFJ	8-/16-BIT BUS CONTROLLER
MSM83C55-XX	40-DIP/44-QFP/44-QFJ	2048 x 8 BIT ROM WITH I/O

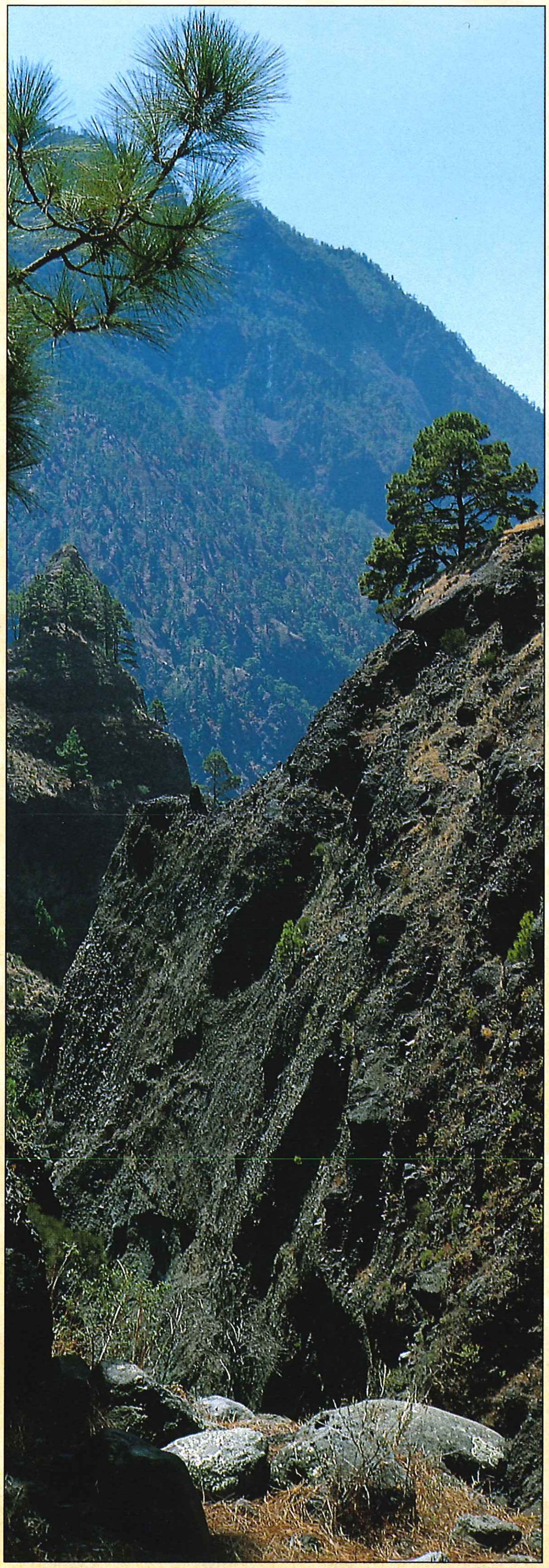
IC CARD CONTROLLER

PART NUMBER	PACKAGES	FUNCTION
MSM62705	5-PAD CHIP/COB	512BYTE EEPROM, 2KBYTE ROM, 64BYTE RAM, 800ns
MSM62715	5-PAD CHIP/COB	1KBYTE EEPROM, 6KBYTE ROM, 128BYTE RAM, 800ns
MSM62720	5-PAD CHIP/COB	2KBYTE EEPROM, 3KBYTE ROM, 128BYTE RAM, 800ns
MSM62725	5-PAD CHIP/COB	2KBYTE EEPROM, 8KBYTE ROM, 192BYTE RAM, 800ns
MSM62745	5-PAD CHIP/COB	4KBYTE EEPROM, 8KBYTE ROM, 192BYTE RAM, 800ns
MSM62785C	5-PAD CHIP/COB	8KBYTE EEPROM, 8KBYTE ROM, 192BYTE RAM, 800ns
MSM627160	5-PAD CHIP/COB	16KBYTE EEPROM, 14KBYTE ROM, 448BYTE RAM, 800ns
MSM62880	5-PAD CHIP/COB	8KBYTE EEPROM, 12KBYTE ROM, 384BYTE RAM, 3/5V
MSM62840	5-PAD CHIP/COB	4KBYTE EEPROM, 10KBYTE ROM, 320BYTE RAM, 3/5V
MSM62881*	5-PAD CHIP/COB	8KBYTE EEPROM, 16KBYTE ROM, 424BYTE RAM, 3/5V
MSM62885*	6-PAD CHIP/COB	8KBYTE EEPROM, 10KBYTE ROM, 636BYTE RAM, 3/5V

* Under development



Speech LSIs



SPEECH PLAYBACK LSIs (OkiADPCM/OkiPCM)

PART NUMBER	PACKAGES	FUNCTION
MSM6650	64-QFP/64-SDIP	EVA-CHIP OF MSM6652/53/54/55/56/58 FOR 64MBIT EXT. ROM, MELODY
MSM6652A-XX	18-DIP/24-SOP	SYNTHESISER, 288KBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM6653A-XX	18-DIP/24-SOP	SYNTHESISER, 544KBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM6654A-XX	18-DIP/24-SOP	SYNTHESISER, 1MBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM66P54	20-DIP/24-SOP	1-MEGABIT OTP-VERSION OF MSM6650 FAMILY ADPCM SYNTHESISERS
MSM6655A-XX	18-DIP/24-SOP	SYNTHESISER, 1.5MBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM6656A-XX	18-DIP/24-SOP	SYNTHESISER, 2MBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM66P56*	20-DIP/24-SOP	2-MEGABIT OTP-VERSION OF MSM6650 FAMILY ADPCM SYNTHESISERS
MSM6658A-XX	24-SOP	SYNTHESISER, 4MBIT ROM, 12-BIT DAC, LPF, MELODY, 127 PHRASES
MSM6378A	16-DIP	SYNTHESISER, 256KBIT OTP, LPF, 12-BIT DAC, 1 PHRASE ~16 SECONDS
MSM6379	16-DIP	SYNTHESISER, 512KBIT OTP, LPF, 12-BIT DAC, 1 PHRASE ~32 SECONDS
MSM6585	18-DIP/24-SOP^	SYNTHESISER, 12-BIT DAC, LPF, FOR EXT. ROM, NO MEMORY I/F
MSM9802-XX	18-DIP/24-SOP^	PCM SYNTHESISER WITH 512KBIT ROM, 10-BIT ADC, LPF, 63 PHRASES
MSM9803-XX	18-DIP/24-SOP^	PCM SYNTHESISER WITH 1MBIT ROM, 10-BIT ADC, LPF, 63 PHRASES
MSM9805-XX	18-DIP/24-SOP^	PCM SYNTHESISER WITH 2MBIT ROM, 10-BIT ADC, LPF, 63 PHRASES
MSM98P05*	18-DIP/24-SOP	2-MEGABIT OTP-VERSION OF MSM9800 FAMILY PCM SYNTHESISERS
MSM6295(V)	44-QFP/(42-DIP)	4-CHANNEL SYNTHESISER, 12-BIT DAC, FOR 2(1)MBIT ROM, 127 PHRASES
MSM9810*	64-QFP	8-CHANNEL SYNTHESISER, STEREO, 14-BIT DAC, LPF, 128KBYTE EXT. ROM
MSM9842*	56(S)-QFP	ADPCM/PCM SYNTHESISER, 512 BYTES FIFO, 14-BIT DAC, LPF, STEREO

SPEECH RECORDER LSIs (OkiADPCM/OkiSBC)

PART NUMBER	PACKAGES	FUNCTION
MSM6588/L	44-QFP/TQFP	AS MSM6388, PLUS VOICE TRIGGER, 3 OR 4-BIT ADPCM, HARD RESET
MSM6688/L	56(S)-QFP/TQFP	ADPCM RECORDER, SA & MCU I/F, 12-BIT ADC/DAC, OpAmp, LPF
MSM6789A/L	100-QFP/TQFP	SBC RECORDER, SA & MCU I/F, 7.5~16KBPS, 12-BIT ADC/DAC, LPF
MSM9841*	56(S)-QFP	ADPCM/PCM RECORDER, 512 BYTES FIFO, 14-BIT ADC/DAC, LPF, STEREO

/L: 3V VERSIONS

SPEECH APPLICATION/INTERFACE LSIs

PART NUMBER	PACKAGES	FUNCTION
MSM6722	24-SOP	VOICE PITCH CONTROLLER, UPPER/LOWER OCTAVE, 17 STEPS
MSC1157	8-DIP/8-SOP	DIRECT SPEAKER DRIVE AMPLIFIER, STANDBY, ADJUSTABLE GAIN
MSA180	8-DIP/8-SOP	DIRECT PIEZO DRIVE AMPLIFIER, STANDBY, ADJUSTABLE GAIN
MSM6691	44-QFP	INTERFACE LSI FOR COMMON DRAMs WITH MSM6388/MSM6588
MSM6690	42-DIP/44-QFP	INTERFACE LSI FOR COMMON EPROMs WITH MSM6388/MSM6588
MSM6791	44-QFP	INTERFACE LSI FOR COMMON DRAMs WITH MSM6688
MSM6792	80-QFP	INTERFACE LSI FOR COMMON SRAMs WITH MSM6688/6789A

SERIAL REGISTERS AND SERIAL ROMs

PART NUMBER	PACKAGES	FUNCTION
MSM6389C	18-QFJ	1 MBIT SERIAL VOICE REGISTER FOR MSM6388/MSM6588
MSM63V89C	26-TSOP	1 MBIT SERIAL VOICE REGISTER FOR MSM6388/MSM6588, 3V
MSM6684B	26-SOJ	4 MBIT SERIAL VOICE REGISTER FOR MSM6388/6588/6688/6789A
MSM66V84B	26-SOJ	4 MBIT SERIAL VOICE REG FOR MSM6388/6588/6688/6789A, 3V
MSM6685	26-SOJ	8 MBIT SERIAL VOICE REGISTER FOR MSM6388/6588/6688/6789A
MSM6595A-XX	18-DIP/18-QFJ/24-SOP^	1 MBIT SERIAL VOICE ROM FOR MSM6388/6588/6688/6789A
MSM6596A-XX	18-DIP/18-QFJ/24-SOP^	2 MBIT SERIAL VOICE ROM FOR MSM6388/6588/6688/6789A
MSM6597A-XX	24-SOP/30-SSOP	3 MBIT SERIAL VOICE ROM FOR MSM6388/6588/6688/6789A

* Under development, ^Also available in 30-pin SSOP (7.6 x 9.7mm), Suffix "-XX" denotes mask code

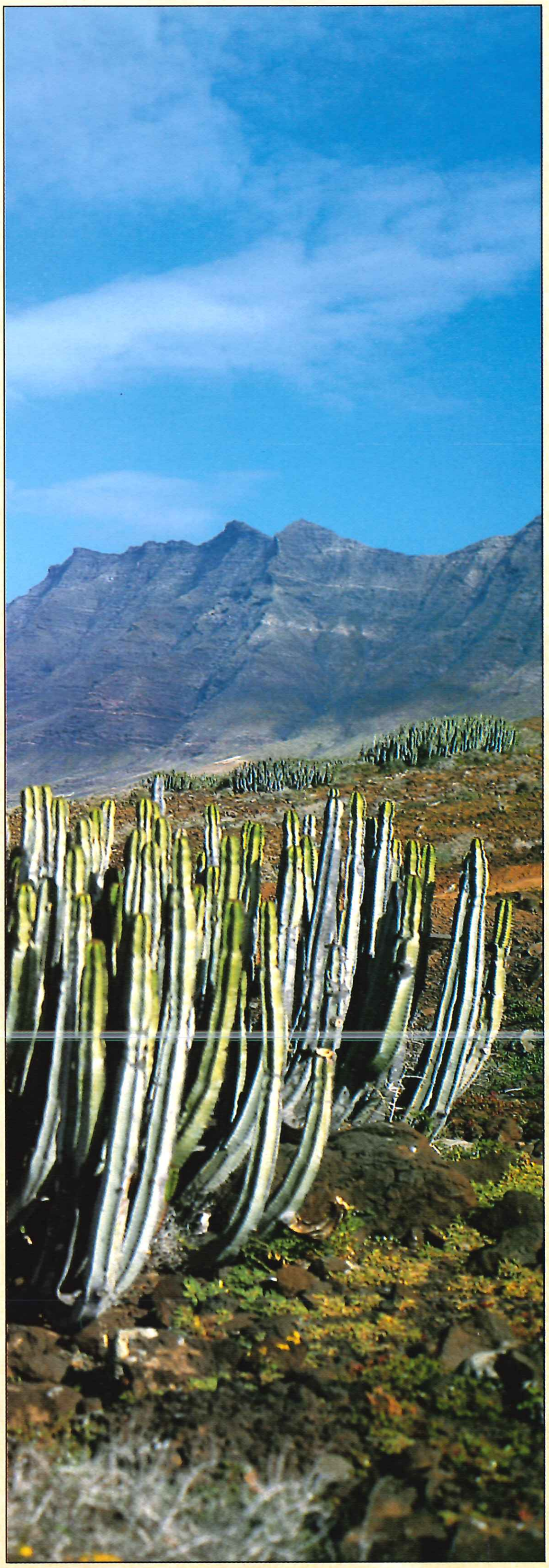
PCM: Pulse Code Modulation (linear or non-linear),

SBC: Sub Band Coding/ADPCM: Adaptive Differential PCM

Telecom LSIs

SINGLE RAIL PCM VOICE CODECs

PART NUMBER	PACKAGES	FUNCTION
MSM7508B	16-DIP/24-SOP/28-QFJ	μ-LAW CODEC, G.711, +5V, SINGLE
MSM7509B	16-DIP/24-SOP/28-QFJ	A-LAW CODEC, G.711, +5V, SINGLE
MSM7533H	20-SDIP/24-SOP	2-CHANNEL μ-LAW CODEC, G.714, +5V, BALANCED
MSM7533V	20-SDIP/24-SOP	2-CHANNEL μ/A-LAW CODEC, G.714, +5V, BALANCED
MSM7534	20-SDIP/24-SOP	2-CHANNEL A-LAW CODEC, G.714, +5V, BALANCED
MSM7541	24-SOP/26-TSOP	μ-LAW CODEC, G.711, +3.3V, BALANCED
MSM7542	24-SOP/26-TSOP	A-LAW CODEC, G.711, +3.3V, BALANCED
MSM7543	24-SOP/26-TSOP	μ-LAW CODEC, G.714, +5V, BALANCED
MSM7544	24-SOP/26-TSOP	A-LAW CODEC, G.714, +5V, BALANCED
MSM7578H	16-DIP/24-SOP/20-SSOP	μ-LAW CODEC, G.711, +5V, SINGLE
MSM7578V	16-DIP/24-SOP/20-SSOP	μ/A-LAW CODEC, G.711, +5V, SINGLE
MSM7579	16-DIP/24-SOP/20-SSOP	A-LAW CODEC, G.711, +5V, SINGLE
MSM7507-01	24-SOP/20-SSOP	μ/A-LAW CODEC, G.711, +5V, BALANCED
MSM7507-02	24-SOP/20-SSOP	μ-LAW CODEC, G.711, +5V, BALANCED
MSM7507-03	24-SOP/20-SSOP	A-LAW CODEC, G.711, +5V, BALANCED
MSM7702-01	24-SOP/ 20-SSOP	μ/A-LAW CODEC, G.711, +3V, SINGLE
MSM7702-02	24-SOP/ 20-SSOP	μ-LAW CODEC, G.711, +3V, SINGLE
MSM7702-03	24-SOP/ 20-SSOP	A-LAW CODEC, G.711, +3V, SINGLE
MSM7717-01	20-SSOP	μ/A-LAW CODEC, G.711, +3V, BALANCED
MSM7717-02	20-SSOP	μ-LAW CODEC, G.711, +3V, BALANCED
MSM7717-03	20-SSOP	A-LAW CODEC, G.711, +3V, BALANCED
MSM7704-01	20-DIP/24-SOP	2-CHANNEL μ/A-LAW CODEC, G.711, +3V, SINGLE
MSM7704-02	20-DIP/24-SOP	2-CHANNEL μ-LAW CODEC, G.711, +3V, SINGLE
MSM7704-03	20-DIP/24-SOP	2-CHANNEL A-LAW CODEC, G.711, +3V, SINGLE
MSM7705-01	44-QFP	4-CHANNEL μ/A-LAW CODEC, G.714, +5V, SINGLE
MSM7705-02	44-QFP	4-CHANNEL A-LAW CODEC, G.714, +5V, SINGLE
MSM7705-03	44-QFP	4-CHANNEL μ-LAW CODEC, G.714, +5V, SINGLE
MSM7716	32-TSOP I	14-BIT LINEAR PCM CODEC, G.714 (8kHz), +3.3V, BALANCED
MSM7502	80-QFP	MULTI-FUNCTION CODEC, G.711, MCU INTERFACE, +5V
MSM7575	64-QFP	μ-/A-/14-BIT LINEAR PROGRAMMABLE PCM CODEC, +3V
MSM6895	80-QFP	A-LAW TERMINAL CODEC FOR DIGITAL PHONES, +5V
MSM6896	80-QFP	μ-LAW TERMINAL CODEC FOR DIGITAL PHONES, +5V



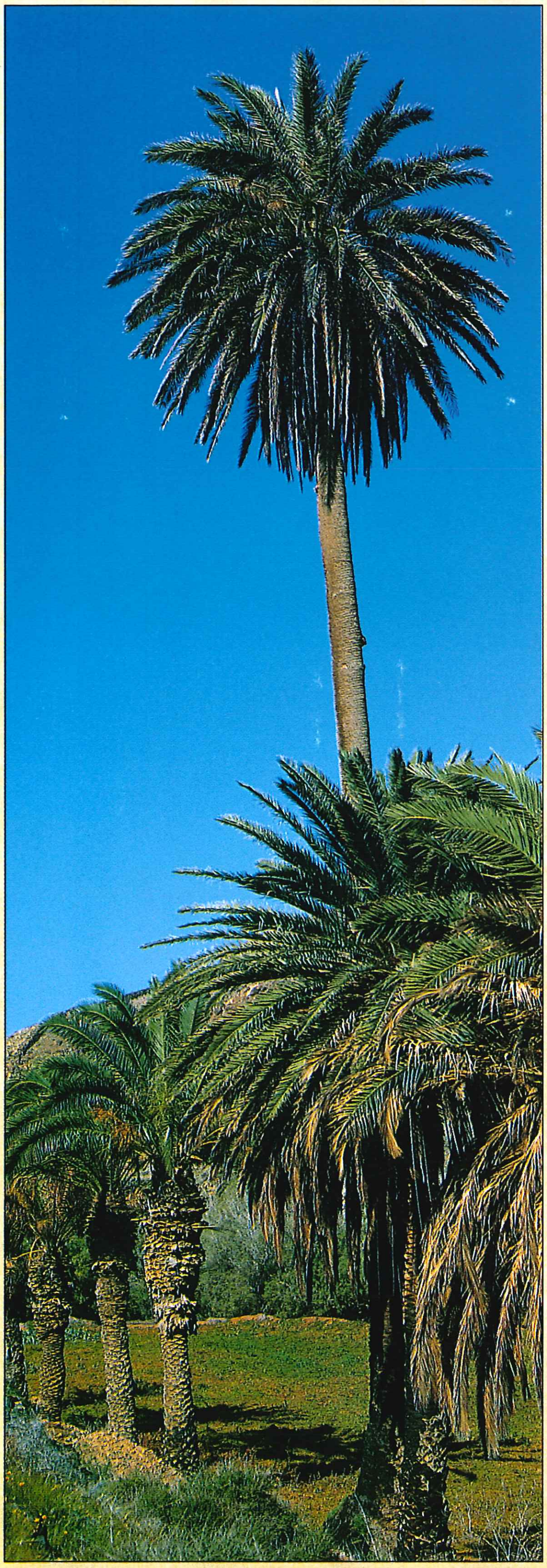
SINGLE RAIL ADPCM CODECs

PART NUMBER	PACKAGES	FUNCTION
MSM7540(L)	28-SOP	ADPCM CODEC, A-LAW, G.711/721, +5V (+3V)
MSM7560	28-SOP	ADPCM CODEC, μ-LAW, G.711/721, +5V
MSM7570(L)	32-TSOP I	ADPCM CODEC, μ/A-LAW, G.711/21/23/26, +5V (+3V)
MSM7590(L)	32-TSOP I	ADPCM CODEC, μ/A-LAW, G.711/21/23/26, +5V (+3V)
MSM7580	28-SOP	2-CH ADPCM TRANSCODER, G.721, PCM INTERFACE, +5V
MSM7581	100-TQFP	4-CH ADPCM TRANSCODER, G.721, PCM INTERFACE, +3V
MSM7708-02	64-TQFP	ADPCM CODEC, G.721, SERIAL REGISTER INTERFACE, +3V
MSM7584C	80-TQFP	ADPCM CODEC, G.721, SERIAL REGISTER I/F, MODEM, +3V
MSM7718-01	100-QFP	ADPCM CODEC, G.726, ECHO CANCELLER, FLASH I/F, +3V

* Under development

NOTES TO TELECOM ICs
AFE: Analog Front End, **FEP**: Front End Processor, **FDX**: Full Duplex, **HDX**: Half Duplex, **DTMF**: Dual Tone Multi Frequency, **DP**: Dial Pulse, **FSK**: Frequency Shift Key, **MSK**: Minimum Shift Key, **PLL**: Phase Lock Loop, **PCM**: Pulse Code Modulation, **ADPCM**: Adaptive Differential Pulse Code Modulation, **AMPS**: Advanced Mobile Phone Service, **TACS**: Total Access Communications System, **ITU-T:** International Telecommunications Union.

Telecom LSIs



CELLULAR/CORDLESS DEVICES

PART NUMBER	PACKAGES	FUNCTION
MSM7532	56-(S)QFP	BASEBAND LSI, MSK MODEM
MSM7707	100-TQFP	BASEBAND LSI FOR DCT, TDMA π /4QPSK MODEM
MSM6807	32-SSOP	BASEBAND FILTER (AMPS/TACS)
MSM6818	44-QFP	SPLIT FILTER (TACS)
MSM6960	24-SOP	PLL SYNTHESIZER
MSM6976	24-SOP	BAND SPLIT FILTER (VOICE/DATA)
MSM7620	32-SSOP/64-QFP	ECHO CANCELLER LSI, CASCADABLE, tcan 27ms
MSM7602	28-SSOP/56(S)-QFP	ECHO CANCELLER LSI, CASCADABLE, tcan 27ms
MSM7603	28-SSOP	ECHO CANCELLER LSI, tcan 55ms
MSM7617*	56(L)-QFP	ECHO CANCELLER LSI, 2-CHANNEL, tcan 55ms
MSM6948	18-DIP/24-SOP	1200 BPS MSK MODEM
MSM6882	22-DIP/24-SOP	1200/2400 BPS MSK MODEM/BASEBAND FILTER
MSM6870	32-SSOP	1200 BPS MSK MODEM/BASEBAND FILTER
MSM7545	16-SOP	CORDLESS VOICE SCRAMBLER
MSM7546	32-SSOP	CORDLESS VOICE SCRAMBLER, MSK MODEM
MSM7555	56(S)-QFP	1200/2400 BPS MSK MODEM / COMPANDER
MSM7557	56(S)-QFP	1200/2400 BPS MSK MODEM / COMPANDER
MSM7547	16-SOP	VOICE SIGNAL LEVEL CONTROLLER, +5V
MSM7577	16-SOP	VOICE SIGNAL LEVEL CONTROLLER, +3V

TELEPHONE CIRCUITS

PART NUMBER	PACKAGES	FUNCTION
MSM7524	32-SSOP	DTMF/CALL PROGRESS TONE TRANSCEIVER
MSM6224	16-DIP	DTMF TONE DIALER
MSM6234	16-DIP	DTMF TONE DIALER, µPC INTERFACE
MSM6253-20	28-DIP	DP/DTMF REPERTORY DIALER

MODEM CIRCUITS

PART NUMBER	PACKAGES	FUNCTION
MSM6946	28-DIP/44-QFP	BELL 103 MODEM, 300 BPS, FDX
MSM6947	28-DIP/44-QFP	BELL 202 MODEM, 1200 BPS, HDX
MSM7510	16-DIP/24-SOP	ITU-T V.21 MODEM, 300 BPS, FDX, +2.7~5.5V
MSM7512B	16-DIP/24-SOP	ITU-T V.23 MODEM, 1200 BPS, HDX, +2.7~5.5V
MSM6888B	42-DIP/56(L)-QFP	300 BPS FSK-MODEM / DTMF TRANSC, TONE DET
MSM7523	42-DIP/56(L)-QFP	300 BPS FSK-MODEM / DTMF TRANSCEIVER
MSM7515	42-DIP/56(L)-QFP	1200 BPS FSK-MODEM / DTMF TRANSC, TONE DET
MSM7516	42-DIP/56(L)-QFP	1200 BPS FSK-MODEM / DTMF TRANSC, TONE DET
MSM7715	44-QFP	TRANSCEIVER FOR TELEMETERING, V.21, DTMF
MSM6994	64-SDIP/64-QFP/68-QFJ	FEP FOR MULTI-STANDARD MODEM

Gate Array & CSA

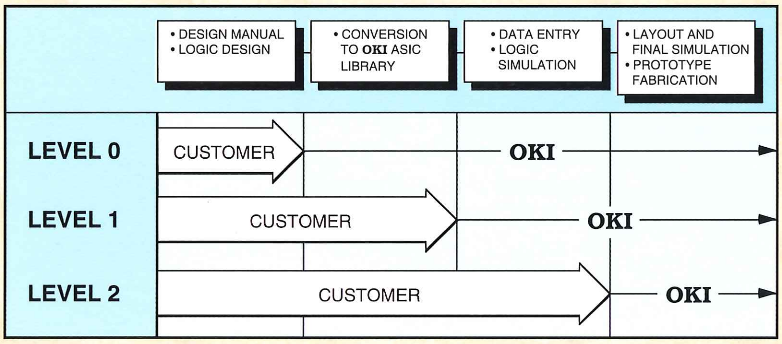
SEA-OF-GATE ARRAYS

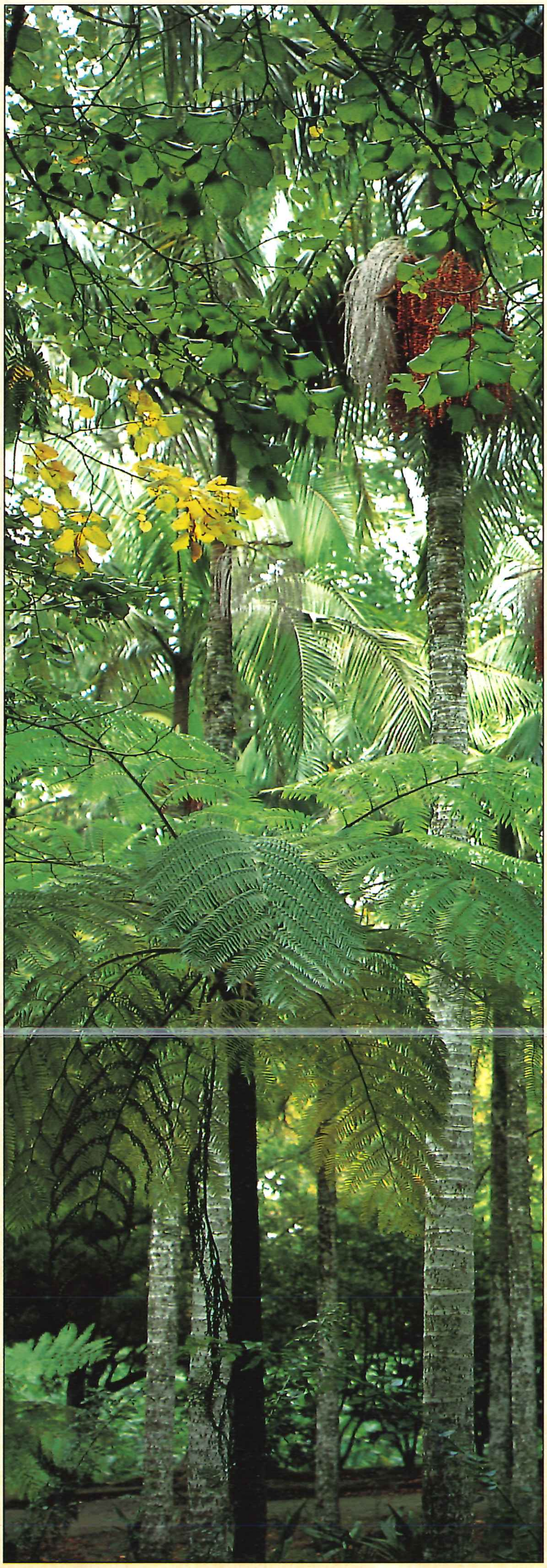
SERIES	PACKAGES	FUNCTION
MSM12R0000	QFP/QFJ/PGA	0.5μm, 17K~107K GATES, 104~240 I/Os, 3.3V/5V, DOUBLE LAYER
MSM13R0000	QFP/QFJ/PGA	0.5μm, 17K~773K GATES, 104~624 I/Os, 3.3V/5V, TRIPLE LAYER
MSM30R0000	QFP/QFJ/PGA	0.5μm, 27K~613K GATES, 104~448 I/Os, 3.3V/5V, TRIPLE LAYER
MSM32R0000	QFP/QFJ/PGA	0.5μm, 56K~306K GATES, 144~320 I/Os, 3.3V/5V, DOUBLE LAYER

CUSTOMER STRUCTURED ARRAYS, CSA

SERIES	PACKAGES	FUNCTION
MSM92R000	QFP/QFJ/PGA	0.5μm, 14K~1.2M GATES, 80~624 I/Os , 3V/5V, TRIPLE LAYER
MSM98R000	QFP/QFJ/PGA	0.5μm, 9K~373K GATES, 80~624 I/Os , 3.3V/5V, TRIPLE LAYER

DESIGN ENTRY LEVELS





SUPPORTED DESIGN KITS & CAD TOOLS

Design Kit	Platform	CAD Tools
Cadence	Sun, HP	Composer, Verilog, Veritime, Verifault, Synergy, Concept, Leapfrog
IKOS	Sun	Alchemy
Mentor	Sun, HP	IDEA, QuickSim, QuickPath, QuickFault, QuickGrade, Autologic
Synopsys	Sun, HP	Design Compiler, HDL, VHDL Compiler, Test Compiler, VSS
ViewLogic	Sun, HP	Workview Plus, Powerview, View Retargeter, View Synthesis
Veda	Sun	System HILO

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LC-Display Driver LSIs

LC-DISPLAY CONTROLLERS

PART NUMBER	PACKAGES	FUNCTION
MSM6262-01	80-QFP	CHARACTER CONTROLLER, 48 COMMON DRIVER, VD 3~11V
MSM6222B-01	80-QFP	CHARACTER CONTROLLER, 16 COM/40 SEG DRIVER, VD 3~8V
MSM6562B-01	CHIP	CHARACTER CONTROLLER, 16 COM/100 SEG DRIVER, VD 3~5.5V
MSM6555B-02	BUMP CHIP	CHARACTER CONTROLLER, 17 COM/80 SEG DRIVER, INT. BIAS
MSM6665-01	128-QFP	CHARACTER CONTROLLER, 17 COM/80 SEG DRIVER, VD 3~6V
MSM6665B-01	BUMP CHIP	CHARACTER CONTROLLER, 17 COM/80 SEG DRIVER, VD 3~6V
MSM6665C-02	128-QFP	CHARACTER CONTROLLER, 17 COM/80 SEG DRIVER, VD 3~8V
MSM9000	CHIP/TCP	CHARACTER CONTROLLER, 16 COM/60 SEG DRIVER, VD 3~5.5V
MSM9005-01	100-QFP	CHARACTER CONTROLLER, 8 COM/65 SEG DRIVER, VD 3~6.3V
MSC5301B-01	100-QFP	CHARACTER CONTROLLER, 16 COM/64 SEG, 1K RAM, VD 4~16V
MSC5301B-02	100-QFP	CHARACTER CONTROLLER, 8 COM/64 SEG, 512B RAM, VD 4~16V

LOW DUTY LC-DISPLAY DRIVERS

PART NUMBER	PACKAGES	FUNCTION
MSM5219B	60-QFP	48 DOT STATIC DRIVER, 1/1 DUTY, VD 4~7V
MSM5221	80-QFP	56 DOT STATIC DRIVER, 1/1 DUTY, VD 4~7V
MSM5265	100-QFP	80 DOT STATIC/160 DOT DYNAMIC DRIVER, 1/2 DUTY, VD 3~7V
MSM6544	56(S)-QFP	42 DOT DUPLEX DRIVER, 1/2 DUTY, VD 3~6V
MSM6775	100-TQFP	80 SEGMENT DRIVER, 1/3, 1/4, 1/5 DUTY, VD 3.5~5.5V
MSM6794	CHIP	48 COMMON/128 SEGMENT, 1/33,1/41,1/44,1/48 DUTY, VD 5~12V
MSM6606	64-QFP	40 SEGMENT DUPLEX DRIVER, 5x6 KEY SCAN
MSM6786	56(S)-QFP	4 COMMON/29 SEGMENT, 1/3, 1/4 DUTY, 5x6 KEY SCAN
MSM9004	64-QFP	49 SEGMENT, 1/3, 1/4 DUTY, 3.5~5.5V, EXT CLOCK, VD 3.5~5.5V
MSM6660-01	80-QFP	62 SEGMENT DUPLEX DRIVER, CASCADABLE, VD 6V

LC-DISPLAY COMMON & SEGMENT DRIVERS

PART NUMBER	PACKAGES	FUNCTION
MSM5238	44-QFP	32 COMMON DRIVER, 1/32~1/64 DUTY, VD 3~16V
MSM5259	56(S)-QFP	40 SEGMENT DRIVER, 1/8~1/16 DUTY, VD 3~6V
MSM5260	100-QFP	80 COMMON / SEGMENT DRIVER, 1/32~1/64 DUTY, VD 8~18V
MSM5298A	80-QFP	68 COMMON DRIVER, 1/64~1/256 DUTY, VD 8~28V
MSM5299A	100-QFP	80 SEGMENT DRIVER, 1/64~1/256 DUTY, VD 8~28V
MSM5839B	56(S)-QFP	40 SEGMENT DRIVER, 1/16~1/128 DUTY, VD 8~18V
MSM5839C	56(S)-QFP	40 SEGMENT DRIVER, 1/1~1/64 DUTY, VD 4~11V
MSM6568	35mm TCP	160 COMMON DRIVER, 1/100~1/480 DUTY, VD 14~40V
MSM6569	35mm TCP	160 SEGMENT DRIVER, 1/100~1/480 DUTY, VD 14~40V
MSM6599B	100-QFP	80 SEGMENT DRIVER, 1/100~1/256 DUTY, VD 14~30V
MSM6648	Slim TCP	50+50 COMMON DUAL-DRIVER, 1/100~1/256 DUTY, VD 14~28V
MSM6649	Slim TCP	80 SEGMENT DRIVER, 1/64~1/256 DUTY, VD 14~28V
MSM6669	Slim TCP	80 SEGMENT DRIVER, 1/100~1/256 DUTY, VD 14~28V
MSM6778	35mm TCP	60+60 COMMON DRIVER, 1/100~1/256 DUTY, VD 18~28V
MSM6697	35mm TCP	192 SEGMENT 16 GREY SCALE TFT SOURCE DRIVER, VD 5V
MSM6667	35mm TCP	240 SEGMENT 64 GREY SCALE TFT SOURCE DRIVER, VD 5V
MSM6698	100-QFP	80 SEGMENT DRIVER, 1/64~1/240 DUTY, VD 14~28V
MSM6779	35mm TCP	160 SEGMENT DRIVER, 1/64~1/256 DUTY, VD 14~28V

VF-Display Driver LSIs

BiCMOS VACUUM FLUORESCENT CONTROLLER

PART NUMBER	PACKAGES	FUNCTION
MSC7128-XX	64-SDIP/64-QFP	5 x 7 DOT MATRIX, 16 DIGIT CONTROLLER, PLA ,-55V
MSC7170-XX	100-QFP	5 x 7 DOT MATRIX, 32 DIGIT CRTL, KEY SCAN, DIM, 60V
MSM9200-XX*	80-QFP	5 x 7 DOT MATRIX, 16 DIGIT, 43 SEG, 16 COM, PLA, -60V
MSM9202-XX	64-QFP/64-SSOP	5 x 7 DOT MATRIX, 16 DIGIT, 37 SEG, 16 COM, PLA, -60V
MSC1162A	60-SSOP	40-BIT ANODE/GRID DRIVER, 65V
MSC1163	60-SSOP	40-BIT ANODE DRIVER, 65V
MSC1164	32-SSOP	20-BIT ANODE/GRID DRIVER, 65V
MSC1212-01	64-QFP	48-SEGMENT GRID/ANODE DRIVER, ~105°C, 18V
MSC7165	24-SOP	16-BIT GRID DRIVER, -60V
MSC7166	24-SOP	16-BIT GRID DRIVER, 65V
MSC7171	24-SOP	12-BIT GRID DRIVER, 65V

BiCMOS VACUUM FLUORESCENT DRIVERS

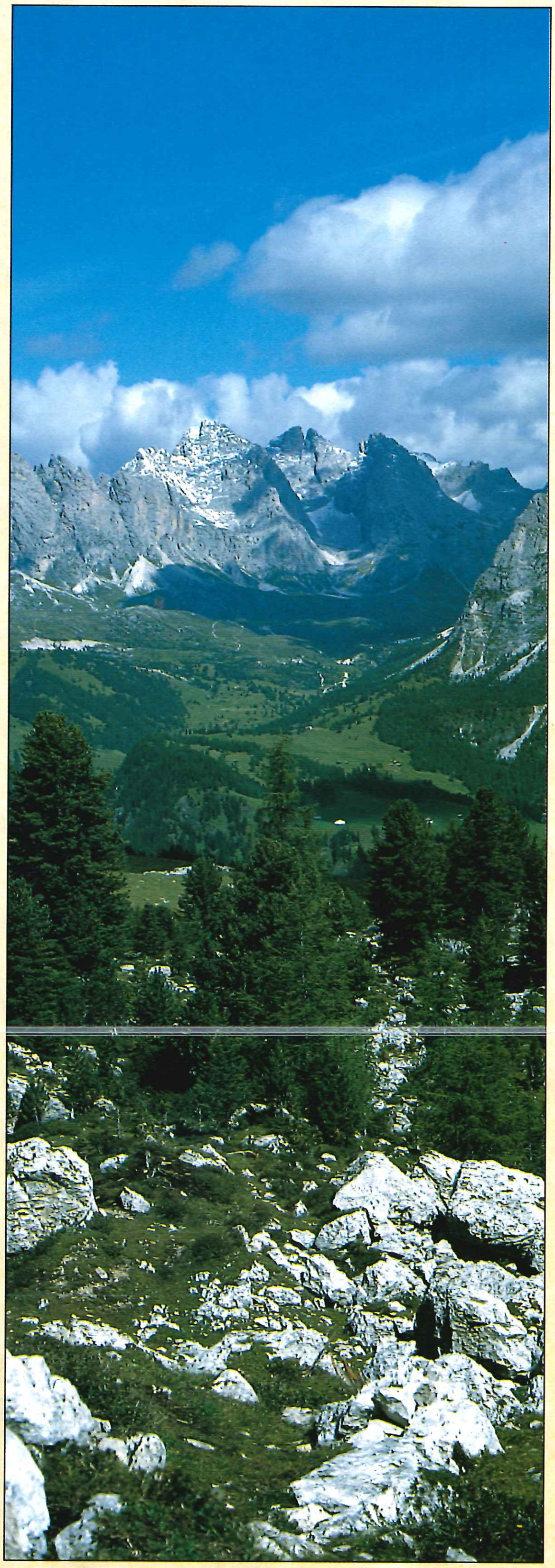
PART NUMBER	PACKAGES	FUNCTION
MSC1200-XX	56(S)-QFP	30-SEGMENT, DUPLEX, KEY SCAN, DIMMING, PLA
MSC1201-XX	44-QFP	30-SEGMENT, DUPLEX, PWM, DIMMING, PLA
MSC1205	42-DIP/44-QFP	32-SEGMENT, DUPLEX, DIMMING
MSC1208	42-SDIP	23-SEGMENT, DUPLEX, DIMMING, KEY SCAN
MSC1209	56(S)-QFP	42-SEGMENT, DUPLEX, DIMMING
MSC1215-XX	42-DIP	17-SEGMENT, DUPLEX, DIMMING, KEYSAN, 6-CH/6-BIT ADC
MSC1218	32-SSOP	21-SEGMENT, TRIPLEX, DIMMING
MSC1213	56(S)-QFP	37-SEGMENT, 2/3 DUTY, DIMMING

NOTES:

PWM: Pulse Width Modulator (to determine dimming curves)

PLA: Programmable Logic Array (to determine output-to-segment allocation).

* Under development



SYNCHRONOUS AND RAMBUS DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM54V25632	100-QFP	256KBIT x 32, DUAL BANK, PULSE RAS, 71/66MHz, 3.3V
MSM56V16400	44-SOJ/44-TSOP	4 MBIT x 4, DUAL BANK, PULSE RAS, 100/83/66MHz, 3.3V
MSM56V16400H	44-SOJ/44-TSOP	4 MBIT x 4, DUAL BANK, PULSE RAS, 66MHz, 9ns, 3.3V
MSM56V16800	44-SOJ/44-TSOP	2 MBIT x 8, DUAL BANK, PULSE RAS, 100/83/66MHz, 3.3V
MSM56V16800H	44-SOJ/44-TSOP	2 MBIT x 8, DUAL BANK, PULSE RAS, 66MHz, 9ns, 3.3V
MSM56V16160	50-SOJ/50-TSOP	1 MBIT x 16, DUAL BANK, PULSE RAS, 100/83/66MHz, 3.3V
MSM57V16900*	32-SHP	2MBIT x 9, RAMBUS, 500MB/s, 1K REFRESH, 3.3V

FAST EDO DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM5416125A	40-SOJ/44-TSOP	128KBIT x 16, FAST PAGE, 45/50/60ns
MSM5416126A	40-SOJ/44-TSOP	128KBIT x 16, EXTENDED DATA OUT, 45/50/60ns
MSM5416127	40-SOJ/44-TSOP	128KBIT x 16, EXTENDED DATA OUT, 50/60ns
MSM5416258A	40-SOJ/44-TSOP	256KBIT x 16, EXTENDED DATA OUT, 30/40ns
MSM5432256*	64-SSOP/70-TSOP	256KBIT x 32, EXTENDED DATA OUT, 45/50/60ns

1-AND 2-MEGABIT DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM511000C/CL	18-DIP/26-SOJ	1 MBIT X 1, FAST PAGE, 512 REF, 45/50/60ns
MSM514256C/CL	20-DIP/26-SOJ	256KBIT x 4, FAST PAGE, 512 REF, 45/50/60ns
MSM51V4256A	26-SOJ	256KBIT x 4, FAST PAGE, 512 REF, 70/80ns, 3.3V
MSM511664C/CL	40-SOJ/44-TSOP	64KBIT x 16, FAST PAGE, 256 REF, 60/70ns, BYTE WRITE
MSM511666C/CL	40-SOJ/44-TSOP	64KBIT x 16, EDO, 256 REF, 60/70ns, BYTE WRITE
MSM518126/L	26-SOJ/26-TSOP	128KBIT x 8, FAST PAGE, 256 REF, 45/50/60ns
MSM518128/L	26-SOJ/26-TSOP	128KBIT x 8, FAST PAGE, 512 REF, 45/50/60ns
MSM518129/L	26-SOJ/26-TSOP	128KBIT x 8, EDO, 512 REF, 45/50/60ns
MSM512100/L	26-SOJ	2 MBIT x 1, FAST PAGE, 512 REF, 60/70/80ns, OE, SIMM PARITY
MSM512200/L	26-SOJ/26-TSOP	1 MBIT x 2, FAST PAGE, 512 REF, 60/70/80ns, SIMM PARITY
MSM512800C	26-SOJ	256KBIT x 8, FAST PAGE, 512 REF, 45/50/60ns, VGA
MSM512805C	26-SOJ	256KBIT x 8, EDO, 512 REF, 40/50/60ns, VGA

4-MEGABIT DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM514100D/DL	26-SOJ/20-ZIP/26-TSOP	4 MBIT x 1, FAST PAGE, 1K REFR, 50/60/70ns
MSM514400D/DL	26-SOJ/20-ZIP/26-TSOP	1 MBIT x 4, FAST PAGE, 1K REFR, 60/70/80ns
MSM514800C/CSL	28-SOJ/28-TSOP	512KBIT x 8, FAST PAGE, 1K REFR, 60/70ns
MSM514900C/CSL	28-SOJ	512KBIT x 9, FAST PAGE, 1K REFR, WRITE PER BIT, 60/70ns
MSM514260C/CSL	40-SOJ	256KBIT x 16, FAST PAGE, 512 REFR, 2CAS/1WE, 50/60/70ns
MSM51V4260C/CSL	40-SOJ/44-TSOP	256KBIT x 16, FAST PAGE, 512 REFR, 2C/1W, 60/70/80ns, 3.3V
MSM514265C/CSL	40-SOJ	256KBIT x 16, EDO, 512 REFR, 2CAS/1WE, 50/60/70ns
MSM51V4265C/CSL	40-SOJ/44-TSOP	256KBIT x 16, EDO, 512 REFR, 2CAS/1WE, 60/70/80ns, 3.3V

L: LOW STANDBY POWER

* Under development

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8-MEGABIT SIMM PARITY RAM

PART NUMBER	PACKAGES	FUNCTION
MSM518200	26-SOJ/26-TSOP	4 MBIT x 2, FAST PAGE, 4K REFRESH, 60/70ns
MSM51V8200*	26-SOJ/26-TSOP	4 MBIT x 2, FAST PAGE, 4K REFRESH, 60/70ns, 3.3V
MSM519200	26-SOJ/26-TSOP	4 MBIT x 2, FAST PAGE, 2K REFRESH, 60/70ns
MSM51V9200*	26-SOJ/26-TSOP	4 MBIT x 2, FAST PAGE, 2K REFRESH, 60/70ns, 3.3V
MSM518205	26-SOJ/26-TSOP	4 MBIT x 2, EDO, 4K REFRESH, 60/70ns
MSM51V8205*	26-SOJ/26-TSOP	4 MBIT x 2, EDO, 4K REFRESH, 60/70ns, 3.3V
MSM519205	26-SOJ/26-TSOP	4 MBIT x 2, EDO, 2K REFRESH, 60/70ns
MSM51V9205*	26-SOJ/26-TSOP	4 MBIT x 2, EDO, 2K REFRESH, 60/70ns, 3.3V

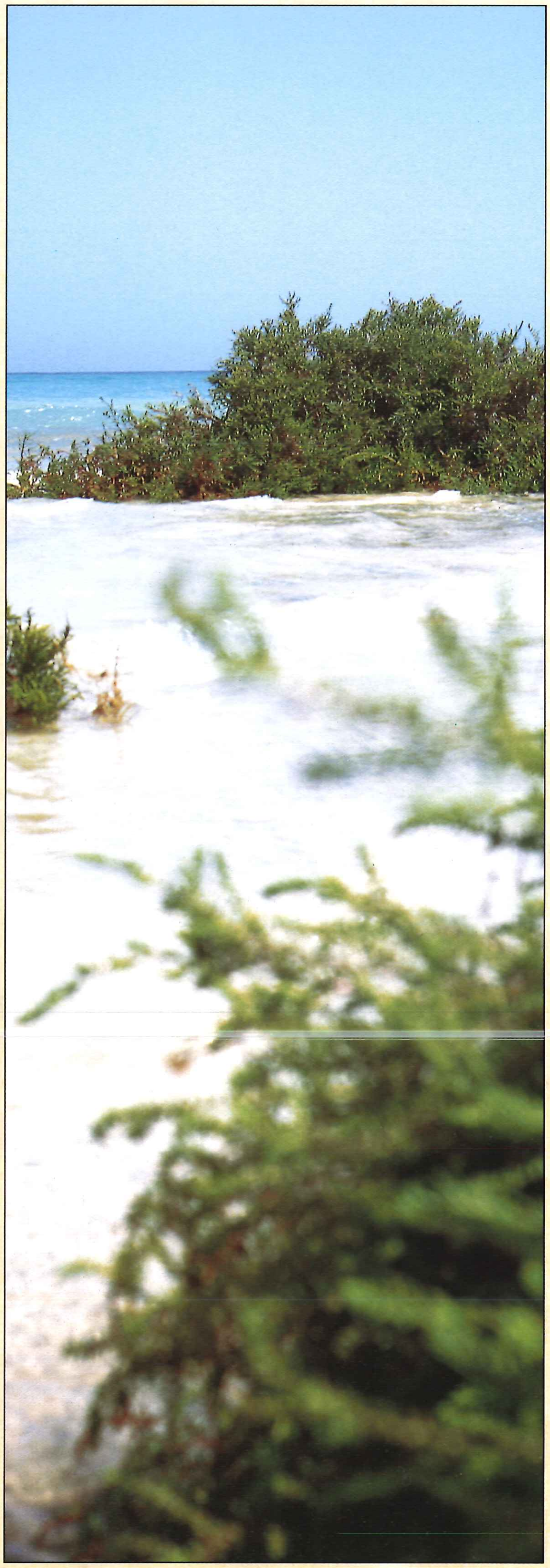
16-MEGABIT DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM5116100A	26-SOJ/26-TSOP	16MBIT x 1, 4K REFRESH, FAST PAGE, 60/70ns, 5V
MSM51V16100A	26-SOJ/26-TSOP	16MBIT x 1, 4K REFRESH, FAST PAGE, 60/70ns, 3.3V
MSM5117100A	26-SOJ/26-TSOP	16MBIT x 1, 2K REFRESH, FAST PAGE, 60/70ns, 5V
MSM51V17100A	26-SOJ/26-TSOP	16MBIT x 1, 2K REFRESH, FAST PAGE, 60/70ns, 3.3V
MSM5116400A	26-SOJ/26-TSOP	4MBIT x 4, 4K REFRESH, FAST PAGE, 60/70ns, 5V
MSM51V16400A	26-SOJ/26-TSOP	4MBIT x 4, 4K REFRESH, FAST PAGE, 60/70ns, 3.3V
MSM5117400A	26-SOJ/26-TSOP	4MBIT x 4, 2K REFRESH, FAST PAGE, 60/70ns, 5V
MSM51V17400A	26-SOJ/26-TSOP	4MBIT x 4, 2K REFRESH, FAST PAGE, 60/70ns, 3.3V
MSM5116405A	26-SOJ/26-TSOP	4MBIT x 4, 4K REFRESH, EDO, 60/70ns, 5V
MSM51V16405A	26-SOJ/26-TSOP	4MBIT x 4, 4K REFRESH, EDO, 60/70ns, 3.3V
MSM5117405A	26-SOJ/26-TSOP	4MBIT x 4, 2K REFRESH, EDO, 60/70ns, 5V
MSM51V17405A	26-SOJ/26-TSOP	4MBIT x 4, 2K REFRESH, EDO, 60/70ns, 3.3V
MSM5116800A	28-SOJ	2MBIT x 8, 4K REFRESH, FAST PAGE, 60/70/80ns, 5V
MSM5117800A	28-SOJ	2MBIT x 8, 2K REFRESH, FAST PAGE, 60/70/80ns, 5V
MSM5116805A	28-SOJ	2MBIT x 8, 4K REFRESH, EDO, 60/70/80ns, 5V
MSM5117805A	28-SOJ	2MBIT x 8, 2K REFRESH, EDO, 60/70/80ns, 5V
MSM5116160A	42-SOJ	1MBIT x 16, 4K RFSH, FAST PAGE, 2CAS/1WE, 60/70/80ns, 5V
MSM5118160A	42-SOJ	1MBIT x 16, 1K RFSH, FAST PAGE, 2CAS/1WE, 60/70/80ns, 5V
MSM5116165A	42-SOJ	1MBIT x 16, 4K RFSH, EDO, 2CAS/1WE, 60/70/80ns, 5V
MSM5118165A	42-SOJ	1MBIT x 16, 1K RFSH, EDO, 2CAS/1WE, 60/70/80ns, 5V

64-MEGABIT DYNAMIC RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM51V65400*	32-SOJ/32-TSOP	16MBIT x 4, 4K REFRESH, FAST PAGE, 50/60ns, 3.3V
MSM51V64400*	32-SOJ/32-TSOP	16MBIT x 4, 8K REFRESH, FAST PAGE, 50/60ns, 3.3V
MSM51V65405*	32-SOJ/32-TSOP	16MBIT x 4, 4K REFRESH, EDO, 50/60ns, 3.3V
MSM51V64405*	32-SOJ/32-TSOP	16MBIT x 4, 8K REFRESH, EDO, 50/60ns, 3.3V
MSM51V65800*	32-SOJ/32-TSOP	8MBIT x 8, 4K REFRESH, FAST PAGE, 50/60ns, 3.3V
MSM51V64800*	32-SOJ/32-TSOP	8MBIT x 8, 8K REFRESH, FAST PAGE, 50/60ns, 3.3V
MSM51V65805*	32-SOJ/32-TSOP	8MBIT x 8, 4K REFRESH, EDO, 50/60ns, 3.3V
MSM51V64805*	32-SOJ/32-TSOP	8MBIT x 8, 8K REFRESH, EDO, 50/60ns, 3.3V
MSM51V65160*	50-SOJ/50-TSOP	4MBIT x 16, 4K REFRESH, FAST PAGE, 2CAS/1WE, 50/60ns, 3.3V
MSM51V64160*	50-SOJ/50-TSOP	4MBIT x 16, 8K REFRESH, FAST PAGE, 2CAS/1WE, 50/60ns, 3.3V
MSM51V65165*	50-SOJ/50-TSOP	4MBIT x 16, 4K REFRESH, EDO, 2CAS/1WE, 50/60ns, 3.3V
MSM51V64165*	50-SOJ/50-TSOP	4MBIT x 16, 8K REFRESH, EDO, 2CAS/1WE, 50/60ns, 3.3V

* Under development



Memory LSIs

FIELD MEMORIES

PART NUMBER	PACKAGES	FUNCTION
MSM514221B	16-DIP/20-ZIP/26-SOJ	1MBIT, 512Cx512Rx4BIT FIELD MEMORY, 25/30ns
MSM514222B	16-DIP/20-ZIP/26-SOJ	1MBIT, 512Cx512Rx4BIT FIELD MEMORY, CASCADE, 25/30ns
MSM514223B	18-DIP	1MBIT, 512Cx512Rx4BIT FIELD MEMORY, CASCADE, 25/30ns
MSM518221	28-SOJ/28-SOP/28-ZIP	2MBIT, 512Cx512Rx8BIT FIELD MEMORY, 25/30ns
MSM518222	28-SOJ/28-SOP/28-ZIP	2MBIT, 512Cx512Rx8BIT FIELD MEMORY, CASCADE, 25/30ns
MSM5412222	40-SOJ/44-TSOP	3.1MBIT, 512Cx512Rx12BIT FIELD MEMORY, CASCADE, 25/30ns
MSM548331	44-TSOP	2.7MBIT, 768Cx290Rx12BIT FIELD MEMORY, CASCADE, 30ns
MSM548332	44-TSOP	3.3MBIT, 960Cx290Rx12BIT FIELD MEMORY, CASCADE, 30ns
MSM548333	100-TQFP	2.9MBIT, 768Cx313Rx12BIT FIELD MEMORY, CASCADE, 30ns

VIDEO RAMs

PART NUMBER	PACKAGES	FUNCTION
MSM514252A	28-SOJ/28-ZIP	256KBIT x 4 VIDEO RAM, 70/80/100ns, BASIC FUNCTIONS
MSM514262	28-SOJ/28-ZIP	256KBIT x 4 VIDEO RAM, 70/80/100ns, EXTENDED FUNCTIONS
MSM518121A	40-SOJ/40-ZIP	128KBIT x 8 VIDEO RAM, 70/80/100ns, BASIC FUNCTIONS
MSM518122	40-SOJ/40-ZIP	128KBIT x 8 VIDEO RAM, 70/80/100ns, EXTENDED FUNCTIONS
MSM548262A	40-SOJ/44-TSOP	256KBIT x 8 VIDEO RAM, 60/70ns, EXTENDED 1
MSM548263A	40-SOJ/44-TSOP	256KBIT x 8 VIDEO RAM, 60/70ns, EXTENDED 2
MSM5416272	64-SSOP	256KBIT x 16 VIDEO RAM, 50/60/70ns, EXTD 1, 2CAS
MSM54V16272	64-SSOP/70-TSOP	256KBIT x 16 VIDEO RAM, 60/70ns, EXTD 1, 2CAS, 3.3V
MSM5416273	64-SSOP	256KBIT x 16 VIDEO RAM, 50/60/70ns, EXTD 2, 2CAS, EDO
MSM54V16273	64-SSOP/70-TSOP	256KBIT x 16 VIDEO RAM, 60/70ns, EXTD 2, 2CAS, EDO, 3.3V
MSM5416282	64-SSOP	256KBIT x 16 VIDEO RAM, 50/60/70ns, EXTD 1, 2WE
MSM54V16282	64-SSOP/70-TSOP	256KBIT x 16 VIDEO RAM, 60/70ns, EXTD 1, 2WE, ,3.3V
MSM5416283	64-SSOP	256KBIT x 16 VIDEO RAM, 50/60/70ns, EXTD 2, 2WE, EDO
MSM54V16283	64-SSOP/70-TSOP	256KBIT x 16 VIDEO RAM, 60/70ns, EXTD 2, 2WE, EDO, 3.3V

GRAPHIC MEMORIES

PART NUMBER	PACKAGES	FUNCTION
MSM5432126A	64-SSOP	4MBIT, 128KBIT x 32 GRAPHIC DRAM, EDO, 40/45/50ns, 5V
MSM54V32126A	64-SSOP/70-TSOP	4MBIT, 128KBIT x 32 GRAPHIC DRAM, EDO, 45/50/60ns, 3.3V

MULTIBANK DRAMs

PART NUMBER	PACKAGES	FUNCTION
MSM519904*	68-QFJ	128KBIT x 32 MULTIBANK DRAM, 100/125/166MHz, 5V
MSM519906*	68-QFJ	197KBIT x 32 MULTIBANK DRAM, 100/125/166MHz, 5V
MSM519908*	68-QFJ	256KBIT x 32 MULTIBANK DRAM, 100/125/166MHz, 5V
MSM519909*	68-QFJ	128KBIT x 32 MULTIBANK DRAM, 100/125/166MHz, 5V

* Under development

Multibank and MDRAM are trademarks of MoSys Incorporated.

4-MEGABIT MASK ROMs

PART NUMBER	PACKAGES	FUNCTION
MSM534001E	32-DIP/32-SOP/32-TSOP	4MBIT (512KBIT x 8), 100ns, 5V
MSM534021E	32-DIP/32-SOP/32-TSOP	4MBIT (512KBIT x 8), 80ns, 5V
MSM534031E	32-DIP/32-SOP/32-TSOP	4MBIT (512KBIT x 8), 120ns 3.3V, 150ns 3V
MSM534002E	42-DIP/44-TSOP/44-SOP	4MBIT (512KBIT x 8 or 256KBIT x 16), 100ns, 5V
MSM534022E	42-DIP/44-TSOP/44-SOP	4MBIT (512KBIT x 8 or 256KBIT x 16), 80ns, 5V
MSM534032E	42-DIP/44-TSOP/44-SOP	4MBIT (512KBIT x 8 or 256KBIT x 16), 120ns 3.3V, 150ns 3V
MSM534052E	42-DIP/44-TSOP/44-SOP	4MBIT (512KBIT x 8 or 256KBIT x 16), 8 W/PAGE, 50ns/P, 5V

8-MEGABIT MASK ROMs

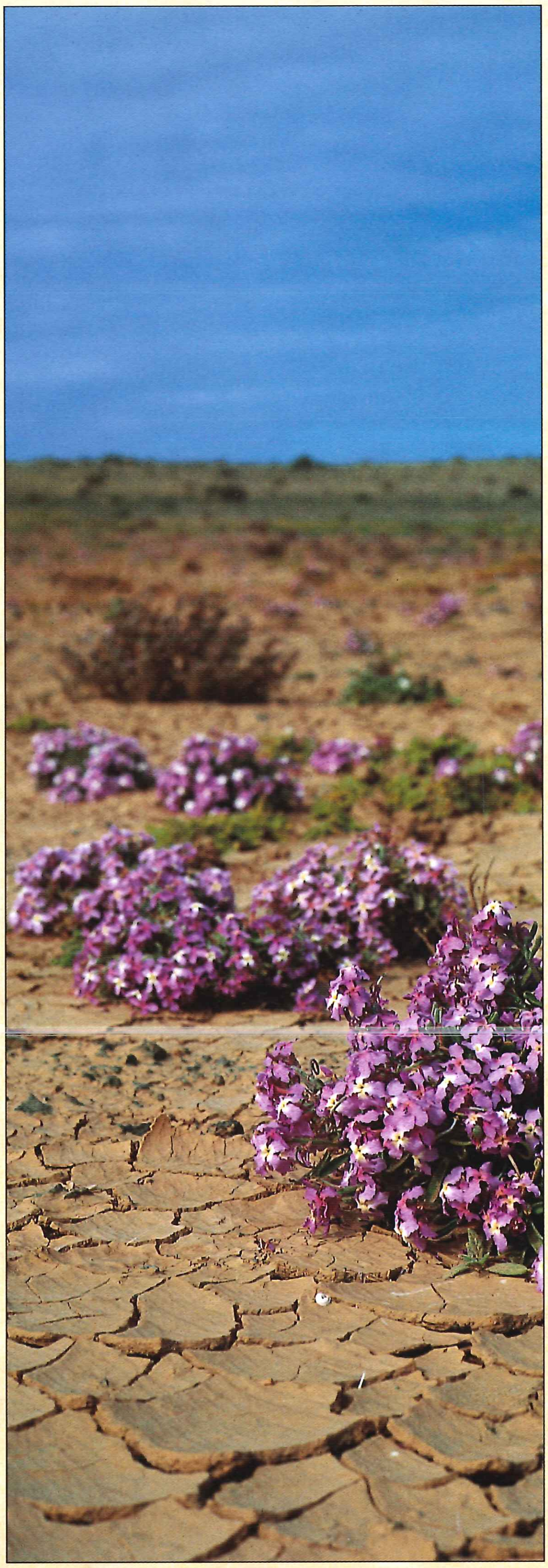
PART NUMBER	PACKAGES	FUNCTION
MSM538001E	32-DIP/32-SOP/32-TSOP	8MBIT (1MBIT x 8), 120ns, 5V
MSM538031E	32-DIP/32-SOP/32-TSOP	8MBIT (1MBIT x 8), 120ns 3.3V, 150ns 3V
MSM538002E	42-DIP/44-SOP/44-TSOP	8MBIT (1MBIT x 8 or 512KBIT x 16), 100ns, 5V
MSM538022E	42-DIP/44-SOP/44-TSOP	8MBIT (1MBIT x 8 or 512KBIT x 16), 80ns, 5V
MSM538032E	42-DIP/44-SOP/44-TSOP	8MBIT (1MBIT x 8 or 512KBIT x 16), 120ns 3.3V, 150ns 3V
MSM538052E	42-DIP/44-SOP/44-TSOP	8MBIT (1MBIT x 8 or 512KBIT x 16), 8 W/PAGE, 50ns/P, 5V

16-MEGABIT MASK ROMs

PART NUMBER	PACKAGES	FUNCTION
MSM531602E	42-DIP/44-SOP/48-TSOP	16MBIT (2MBIT x 8 or 1MBIT x 16),100ns, 5V
MSM531632E	42-DIP/44-SOP/48-TSOP	16MBIT (2MBIT x 8 or 1MBIT x 16), 150ns 3.3V, 200ns 3V
MSM531602F	42-DIP/44-SOP/48-TSOP	16MBIT (2MBIT x 8 or 1MBIT x 16), 100ns, 5V
MSM531622F	42-DIP/44-SOP/48-TSOP	16MBIT (2MBIT x 8 or 1MBIT x 16), 80ns, 5V
MSM531632F	42-DIP/44-SOP/48-TSOP	16MBIT (2MBIT x 8 or 1MBIT x 16), 120ns 3.3V, 150ns 3V
MSM531605E	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 100ns, 5V
MSM531625E	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 80ns, 5V
MSM531635E	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 120ns 3.3V, 150ns 3V
MSM531655E	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 8DW/PAGE, 50ns/P, 5V
MSM531655F	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 4DW/PAGE, 30ns/P, 5V
MSM53V1655F	70-SSOP/70-TSOP	16MBIT (1MBIT x 16 or 512KBIT x 32), 4DW/PAGE, 40ns/P, 3.3V

32-MEGABIT MASK ROMs

PART NUMBER	PACKAGES	FUNCTION
MSM533202E	44-SOP/48-TSOP	32MBIT (2MBIT x 16 or 4MBIT x 8, 120ns, 5V
MSM533202E-F	44-SOP/48-TSOP	32MBIT (2MBIT x 16 or 4MBIT x 8, 100ns, 5V
MSM533232E	44-SOP/48-TSOP	32MBIT (2MBIT x 16 or 4MBIT x 8, 150ns 3.3V, 200ns 3V
MSM533203E	42-DIP	32MBIT (2MBIT x 16), 120ns, 5V
MSM533203E-F	42-DIP	32MBIT (2MBIT x 16), 100ns, 5V
MSM533233E	42-DIP	32MBIT (2MBIT x 16), 150ns 3.3V, 200ns 3V
MSM533204E	42-DIP	32MBIT (4MBIT x 8) ,120ns, 5V
MSM533204E-F	42-DIP	32MBIT (4MBIT x 8), 100ns, 5V
MSM533234E	42-DIP	32MBIT (4MBIT x 8), 150ns 3.3V, 200ns 3V



72-SIMM EDO MODULES

PART NUMBER	MODULE	FUNCTION
MSC2313258A	72-SIMM	4 MB (1MBIT x 32), 1MBIT x 16 DRAM BASED, 1K, 1 BANK, EDO, 60/70ns
MSC2313256A	72-SIMM	4 MB (1MBIT x 32), 1MBIT x 16 DRAM BASED, 4K, 1 BANK, EDO, 60/70ns
MSC2323258A	72-SIMM	8 MB (2MBIT x 32), 1MBIT x 16 DRAM BASED, 1K, 2 BANKS, EDO, 60/70ns
MSC2323256A	72-SIMM	8 MB (2MBIT x 32), 1MBIT x 16 DRAM BASED, 4K, 2 BANKS, EDO, 60/70ns
MSC2343257A	72-SIMM	16 MB (4MBIT x 32), 4MBIT x 4 DRAM BASED, 2K, 1 BANK, EDO, 60/70ns
MSC2343657A	72-SIMM	16 MB (4MBIT x 36), 4MBIT x 4 DRAM BASED, 1 BANK, EDO, 60/70ns
MSC2383257A	72-SIMM	32 MB (8MBIT x 32), 4MBIT x 4 DRAM BASED, 2K, 2 BANKS, EDO, 60/70ns
MSC2383657A	72-SIMM	32 MB (8MBIT x 36), 4MBIT x 4 DRAM BASED, 2 BANKS, EDO, 60/70ns

72-SIMM BYTE-WIDE MODULES

PART NUMBER	MODULE	FUNCTION
MSC23B1321A	72-SIMM	4 MB (1MBIT x 32), 1MBIT x 16 DRAM BASED, 1K, FAST PAGE, 60/70ns
MSC23B136A	72-SIMM	4 MB (1MBIT x 36), 1MBIT x 16 DRAM BASED, 1K, FAST PAGE, 60/70ns
MSC23B2331A	72-SIMM	8 MB (2MBIT x 32), 1MBIT x 16 DRAM BASED, 1K, FAST PAGE, 60/70ns
MSC23B236A	72-SIMM	8 MB (2MBIT x 36), 1MBIT x 16 DRAM BASED, 1K, FAST PAGE, 60/70ns
MSC23B23217A	72-SIMM	8 MB (2MBIT x 32), 2MBIT x 8 DRAM BASED, 2K, FAST PAGE, 60/70ns
MSC23B23617A	72-SIMM	8 MB (2MBIT x 36), 2MBIT x 8 DRAM BASED, 2K, FAST PAGE, 60/70ns

72-SIMM FAST PAGE MODE MODULES

PART NUMBER	MODULE	FUNCTION
MSC23432AA	72-SIMM	16 MB (4MBIT x 32), 4MBIT x 4 DRAM BASED, 1 BANK, FAST PAGE, 60/70ns
MSC23436AA	72-SIMM	16 MB (4MBIT x 36), 4MBIT x 4 DRAM BASED, 1 BANK, FAST PAGE, 60/70ns
MSC23832AA	72-SIMM	32 MB (8MBIT x 32), 4MBIT x 4 DRAM BASED, 2 BANKS, FAST PAGE, 60/70ns
MSC23836AA	72-SIMM	32 MB (8MBIT x 36), 4MBIT x 4 DRAM BASED, 2 BANKS, FAST PAGE, 60/70ns

168-DIMM FAST PAGE MODE MODULES

PART NUMBER	MODULE	FUNCTION
MSC23T1720C	168-DIMM	8 MB (1MBIT x 72), 1MBIT x 4 DRAM (TSOP) BASED, ECC, 60/70ns
MSC23D1720C	168-DIMM	8 MB (1MBIT x 72), 1MBIT x 4 DRAM (SOJ) BASED, ECC, 60/70ns
MSC23D1721C	168-DIMM	8 MB (1MBIT x 72), 1MBIT x 4 DRAM (SOJ) BASED, PARITY, 60/70ns
MSC23T2720A	168-DIMM	16 MB (2MBIT x 72), 2MBIT x 8 DRAM (TSOP) BASED, ECC, 60/70ns
MSC23D2721A	168-DIMM	16 MB (2MBIT x 72), 2MBIT x 8 DRAM (SOJ) BASED, PARITY, 60/70ns
MSC23T4720A	168-DIMM	32 MB (4MBIT x 72), 4MBIT x 4 DRAM (TSOP) BASED, ECC, 60/70ns
MSC23D4721A	168-DIMM	32 MB (4MBIT x 72), 4MBIT x 4 DRAM (SOJ) BASED, PARITY, 60/70ns

NOTE: 3.3V or EDO versions can be supplied upon request.

72-S/O DIMM FAST PAGE MODE MODULES

PART NUMBER	MODULE	FUNCTION
MSC23C132C	72-S/O DIMM	4 MB (1MBIT x 32), 1MBIT x 16 DRAM BASED, 60/70ns
MSC23C136C	72-S/O DIMM	4 MB (1MBIT x 36), 1MBIT x 16 DRAM BASED, 60/70ns
MSC23C232A	72-S/O DIMM	4 MB (2MBIT x 32), 1MBIT x 16 DRAM BASED, 1 BANK, 60/70ns
MSC23C236A*	72-S/O DIMM	8 MB (2MBIT x 36), 1MBIT x 16 DRAM BASED, 1 BANK, 60/70ns
MSC23C2322A	72-S/O DIMM	8 MB (2MBIT x 32), 1MBIT x 16 DRAM BASED, 2 BANKS, 60/70ns
MSC23C2362A*	72-S/O DIMM	8 MB (2MBIT x 36), 1MBIT x 16 DRAM BASED, 2 BANKS, 60/70ns
MSC23C432A	72-S/O DIMM	16 MB (4MBIT x 32), 4MBIT x 4 DRAM BASED, 60/70ns
MSC23C436A*	72-S/O DIMM	16 MB (4MBIT x 32), 4MBIT x 4 DRAM BASED, 60/70ns

NOTE: All modules also available as 3.3V versions. Other configurations can be developed on demand.

* Under development

Since this list of memory modules represents only a part of the offer, please be so kind as to inquire with your specific configuration.

Special Purpose LSIs
and SAW Filters

OKI
Electronic Components

DIGITAL VIDEO CONVERTERS

PART NUMBER	PACKAGES	FUNCTION
MSM7650	80-QFP	NTSC/PAL DIGITAL ENCODER, 3-CH/9-BIT DAC
MSM7660	80-QFP	NTSC/PAL DIGITAL DECODER, ADAPTIVE COMB FILTER
MSM5258	8-DIP	SYNC SIGNAL GENERATOR FOR PAL/NTSC

INTERFACE LSIs

PART NUMBER	PACKAGES	FUNCTION
MSA704	8-DIP/8-SOP	SERIAL TELECOM INTERFACE, ISO9141
MSM6636	18-DIP/24-SOP/18-QFJ	SAE J1850 CONTROLLER
MSM6307	28-DIP/32-SOP	D2B BUS TRANSCEIVER LSI
MSM10T0175-042	42-DIP/44-QFJ	DUAL ISO SMART CARD INTERFACE LSI, T=0
MSM69200	64-QFP	IC CARD INTELLIGENT INTERFACE DEVICE, T=0,T=1

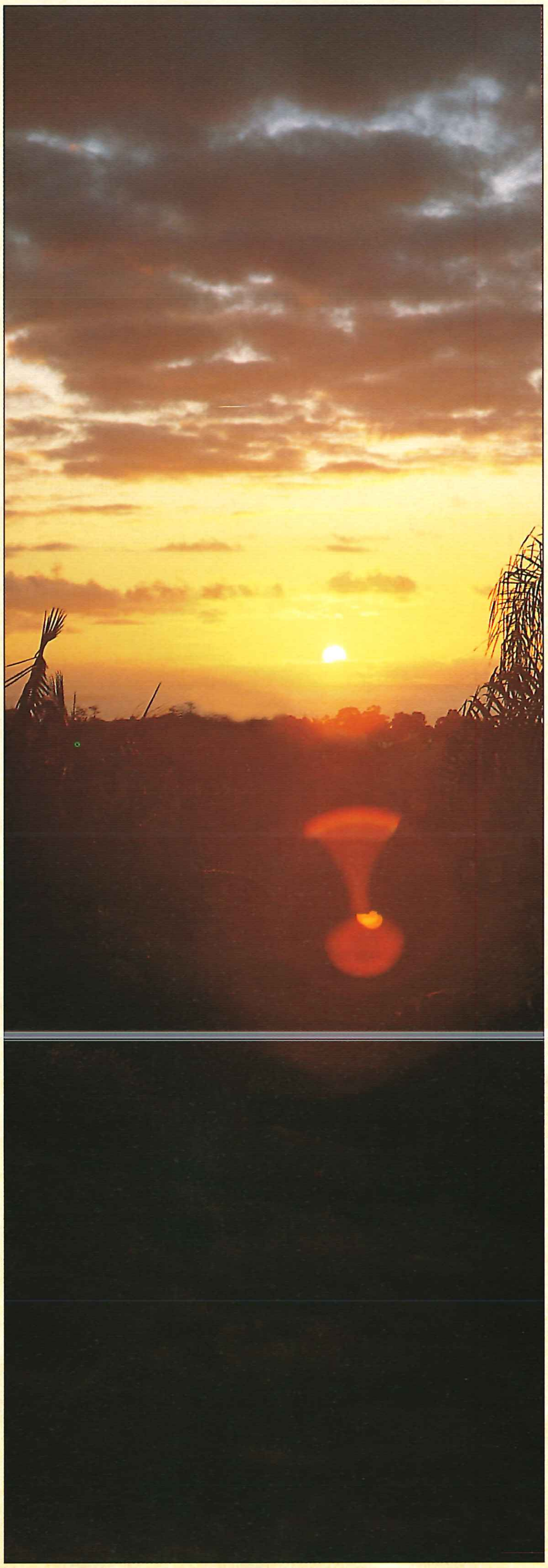
WIRELESS APPLICATION LSIs

PART NUMBER	PACKAGES	FUNCTION
MSM9552	44-QFP	DARC/SWIFT/FMSS MULTIPLEX DEMODULATOR, +5V
MSM9553	44-QFP	DARC/SWIFT/FMSS MULTIPLEX DEMODULATOR, +3V
MSM7730(.XI)	144-TQFP	WLAN CONTROLLER, IEEE802.11*, 2MBPS, +3V/+5V
MSM9600	24-SOP	POCSAG PAGER DECODER, +0.9~3.5V

* Draft Standard IEEE802.11 D5

OTHERS

PART NUMBER	PACKAGES	FUNCTION
MSC7150-03/05	8-DIP/8-SOP	DC-DC CONVERTER, 1.5 -> 3V/5V
MSM5230	80-QFP	DIGITAL MULTIMETER LSI
MSM5232	42-DIP	8-CHANNEL TONE GENERATOR



NOTES TO WIRELESS ICs

DARC: DAta Radio Channel (Japan), registered trademark of NHK Engineering Service
SWIFT: System for Wireless Infotainment Forwarding and Teledistribution (Europe),
FMSS: Frequency Modulation Subcarrier Service (USA),
IEEE: Institute of Electrical and Electronics Engineers, **WLAN**: Wireless Local Area Network,
POCSAG: Post Office Code Standardisation Advisory Group.

SAW BAND PASS FILTERS 50Ω MATCHED

PART NUMBER	PACKAGE	FUNCTION
MBF9321	6-CER SMD	GSM/NMT SAW-FILTER, PASS 890~915MHz TRANSMIT
MBF9323	6-CER SMD	GSM/NMT SAW-FILTER, PASS 935~960MHz RECEIVE
MBF9301	6-CER SMD	AMPS SAW-FILTER, PASS 824~849MHz TRANSMIT
MBF9305	6-CER SMD	AMPS SAW-FILTER, PASS 869~894MHz RECEIVE
MBF9341	6-CER SMD	PCS SAW-FILTER, PASS 1850~1910MHz TRANSMIT
MBF9342	6-CER SMD	PCS SAW-FILTER, PASS 1930~1990MHz RECEIVE
MBF9346	6-CER SMD	PDC SAW-FILTER, PASS 1429~1453MHz TRANSMIT
MBF9347	6-CER SMD	PDC SAW-FILTER, PASS 1477~1501MHz RECEIVE

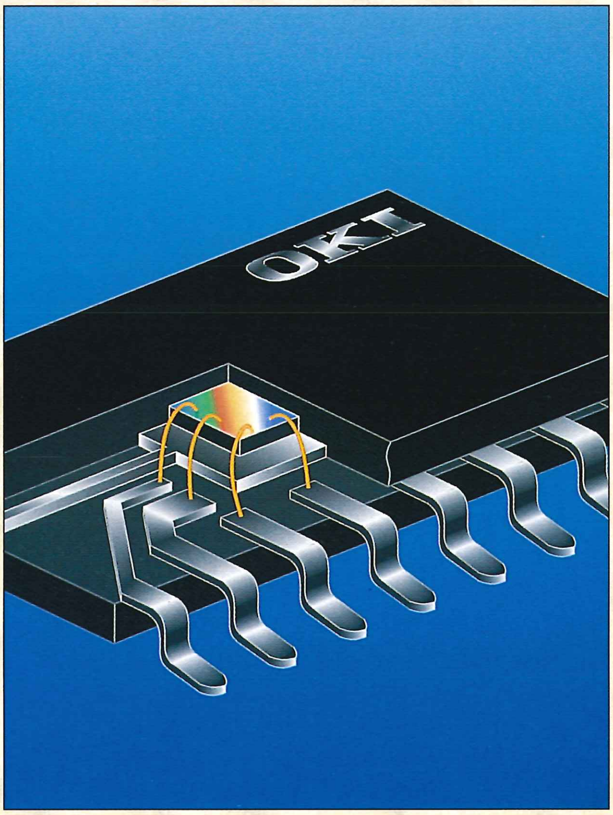
SAW: Surface Acoustic Wave (Band-pass Filter)

Gallium Arsenide

ANALOG & DIGITAL GaAs DEVICES

PART NUMBER	PACKAGE	FUNCTION
KGF1145	SOT 143-TYPE	2-STAGE BUFFER AMPLIFIER, ≥2dBm at 850MHz
KGF1146	SOT 143-TYPE	2-STAGE BUFFER AMPLIFIER, ≥1.5dBm at 850MHz
KGF1155B	SOT 143-TYPE	DUAL-GATE MIXER AMPLIFIER, ≥3dBm at 850MHz
KGF1156	SOT 143-TYPE	DUAL-GATE MIXER AMPLIFIER, ≥6dBm at 850MHz
KGF1165	SOT 143-TYPE	50Ω MATCHED FEEDBACK AMPLIFIER, ≥7dBm at 850MHz
KGF1175B	SOT 143-TYPE	LOW NOISE HEAD AMPLIFIER, ≥3dBm at 850MHz
KGF1521	SOT 143-TYPE	SIGNAL AMPLIFIER, NF 1.8dB, ≥3dBm at 1.9GHz, 3V
KGF1522	SOT 143-TYPE	SIGNAL AMPLIFIER, NF 1.3dB, ≥2dBm at 1.9GHz, 3V
KGF1531	SOT 143-TYPE	DUAL GATE MIXER, ≥0dBm at 1.9GHz, 3V
KGF1191	SOT 143-TYPE	BUFFER AMPLIFIER, 0dBm typ. at 1.9GHz, 3V
KGF1254B	SOT 143-TYPE	MEDIUM POWER AMPLIFIER, 18dBm typ. at 1.9GHz
KGF1256B	SOT 143-TYPE	MEDIUM POWER AMPLIFIER, 11.5dBm typ. at 1.9GHz
KGF1256D	SOT 143-TYPE	MEDIUM POWER AMPLIFIER, 13.0dBm typ. at 1.5GHz, 3V
KGF1181B	SOT 143-TYPE	50Ω MATCHED DRIVER AMPLIFIER, ≥11.5dBm at 850MHz
KGF1183	SOT 143-TYPE	FEEDBACK AMPLIFIER, ≥17dBm at 850MHz
KGF1262	SOT 143-TYPE	DUAL GATE FET, ≥18dBm at 1.9GHz
KGF1283	SOT 89-TYPE	POWER FET, ≥26.5dBm at 850MHz, EFF 60% typ.
KGF1284	SOT 89-TYPE	POWER FET, ≥21.5dBm at 1.9GHz, EFF 50% typ., 3.4V
KGF1312	SOT 89-TYPE	POWER FET, ≥31dBm at 850MHz, EFF 70% typ.
KGF1313	SOT 89-TYPE	POWER FET, ≥27dBm at 1.9GHz, EFF 50% typ., 3.4V
KGF1323	SOT 89-TYPE	POWER FET, ≥33dBm at 850MHz, EFF 70% typ.
KGF1323C	SOT 89-TYPE	POWER FET, ≥33dBm at 1.8GHz, EFF 63% typ.
KGF1323F	SOT 89-TYPE	POWER FET, ≥31.5dBm at 850MHz, EFF 70% typ.
KGF1305T	4-PIN CER THD	POWER FET, ≥31.5dBm at 850MHz, EFF ≥66%
KGF1321S	4-PIN CER SMD	POWER FET, ≥31.5dBm at 850MHz, EFF ≥70%
KGF1322	4-PIN CER THD	POWER FET, ≥33.0dBm at 850MHz, EFF ≥60%
KGF1322S	4-PIN CER SMD	POWER FET, ≥32.0dBm at 850MHz, EFF ≥70%
KGF1606	4-PIN CER SMD	POWER FET, ≥31.5dBm at 1900MHz, EFF ≥70%, 3.4V
KGF1607	4-PIN CER SMD	POWER FET, ≥31.5dBm at 850MHz, EFF ≥70%, 3.4V
KGF1608	4-PIN CER SMD	POWER FET, ≥33.0dBm at 850MHz, EFF ≥75%, 3.4V
KGF1658	4-PIN CER SMD	POWER FET, ≥32.5dBm at 850MHz, EFF ≥50%, 3.4V
KGF1631	SOT 89-TYPE	POWER FET, ≥24.5dBm at 850MHz, EFF ≥50%, 3.4V
KGF1633	SOT 89-TYPE	POWER FET, ≥28.0dBm at 850MHz, EFF ≥70%, 3.4V
KGF1637	SOT 89-TYPE	POWER FET, ≥31.5dBm at 850MHz, EFF ≥60%, 3.4V
KGF1638	SOT 89-TYPE	POWER FET, ≥33.0dBm at 850MHz, EFF ≥60%, 3.4V
KGF2701	8-PIN CER	WIDE BAND AMPLIFIER MMIC, ~4GHz, ≥14dBm
KGF2702	8-PIN SOP	WIDE BAND AMPLIFIER MMIC, ~4GHz, ≥14dBm
KGF1203	8-PIN SOP	SINGLE BALANCED MIXER, Gc ≥ 4dB min., 3V
KGL2441	8-PIN SOP	WIDE DYNAMIC RANGE AGC AMPLIFIER, 70~130MHz
KGL2132	8-PIN SOP	PRESCALER, 1/164 1/65, 2GHz, 3V
KGL2135	8-PIN SOP	PRESCALER, 1/128 1/130, 1.7GHz, 3V

FET: Field Effect Transistor; EFF: Drain Efficiency; NF: Noise Figure
MMIC: Monolithic Microwave Integrated Circuit



PACKAGING VARIETY

THROUGH HOLE TYPES

- PLASTIC DUAL-IN-LINE
- CERAMIC DUAL-IN-LINE
- PLASTIC SKINNY DUAL-IN-LINE
- PLASTIC SHRINK DUAL-IN-LINE
- CERAMIC PIN GRID ARRAY
- PLASTIC PIN GRID ARRAY
- PLASTIC ZIG-ZAG-IN LINE
- SINGLE-IN-LINE PACKAGE

SURFACE MOUNT TYPES

- PLASTIC SMALL OUTLINE PACKAGE
- THIN SMALL OUTLINE PACKAGE
- PLASTIC QUAD FLAT PACKAGE
- THIN QUAD FLAT PACKAGES
- HIGH PIN COUNT FLAT PACKAGE
- PLASTIC LEADED CHIP CARRIER
- LEADLESS CERAMIC CARRIER
- TAPE CARRIER PACKAGE
- CHIP-ON-BOARD / BUMP CHIP

ROUGH SOLDERING GUIDELINES

PACKAGE TYPE	METHODOLOGY	CONDITIONS	CYCLES
DIP / ZIP / SOP (<24-pin)	Wave soldering	260°C x 10 sec max	1
SOP (≥24-pin)	Reflow soldering	240°C x 10 sec max	1
SOP / QFP	Reflow soldering	240°C x 10 sec max	1
TSOP / TQFP	Reflow soldering	220°C x 10 sec max	1
QFJ / QFN	Reflow soldering	215°C x 10 sec max	1

NOTE: SOPs, QFPs, SOJs and QFJs shipped in dry packs can be reflow-soldered without prior treatment as long as the assembly conditions as labelled on each pack are maintained. TSOPs and TQFPs require to be dried before assembly although shipped in dry packs. Please always make sure that the lead coplanarity of the given package suits your reflow soldering conditions. For maximum safety, OKI recommends only one soldering cycle. Please consult OKI for more accurate information on assembly techniques.

USEFUL PACKAGING INFORMATION

• PART NUMBERING

MSM 83C154 S - XX JS

JS — Package identifier
XX — Custom mask code (Memories: access time)
S — Index for special specs.
83C154 — Part number
MSM — Technology identifier

• PACKAGE IDENTIFIERS

RS:	Plastic dual-in-line	DIP
SS:	Plastic shrink dual-in-line	SDIP
MS:	Plastic small outline (<24-pin)	SOP/SSOP
GS:	Plastic quad flat package	QFP
or	Plastic small outline (>20-pin)	SOP/SSOP
TS:	Thin small outline package	TSOP
or	Thin quad flat package	TQFP
JS:	Plastic leaded chip carrier	QFJ
or	Small outline J-bent 300mil	SOJ
J:	Small outline J-bent 350mil	SOJ
ES:	Ceramic leadless carrier	QFN
ZS:	Plastic zig-zag in-line package	ZIP
AS:	Ceramic dual-in-line	CERDIP
VS:	Ceramic piggyback	CERDIP
BS:	Pad memory module (gold)	SIMM/DIMM
DS:	Pad memory module (solder)	SIMM/DIMM
KS:	Pin memory module	SIMP
AV:	Tape carrier package	TCP

• TECHNOLOGY IDENTIFIERS

MSM:	MOS IC
MSC:	Bi-CMOS
MSA:	LINEAR IC
MSL:	BIPOLAR IC

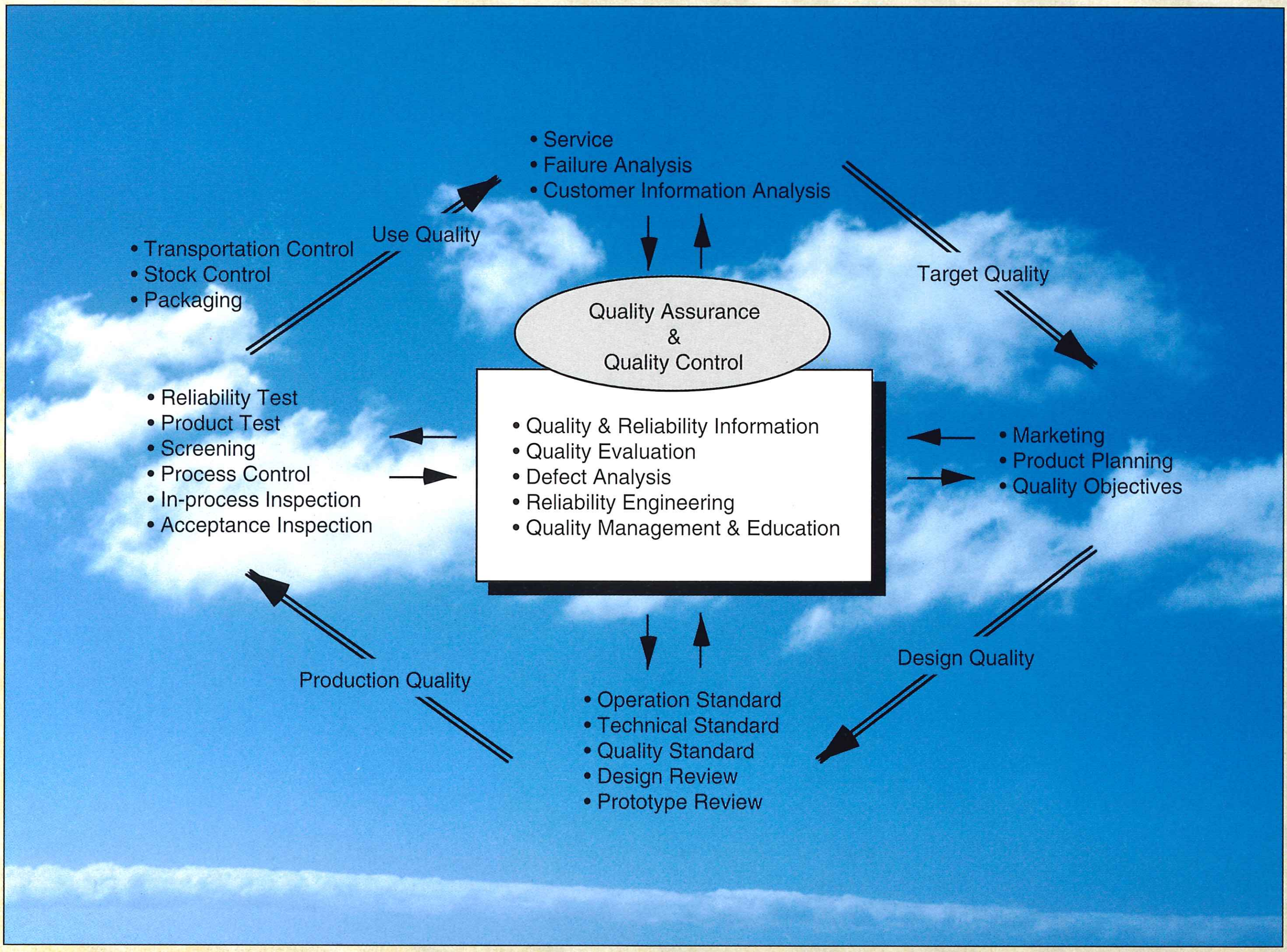
• TYPICAL LOT CODE IDENTIFICATION

6 10 22 31

31 — Lot serial code, 2 or more digits
22 — Factory of manufacture & test
10 — Week of the year, here week 10
6 — Last digit of the year, here 1996

6 3 22

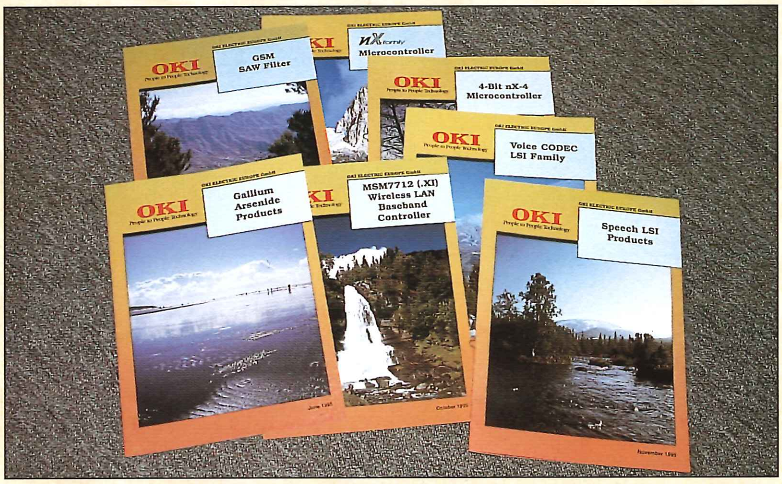
22 — Lot serial code, 2 digits
3 — Month, here March (X/Y/Z: Oct-Dec)
6 — Last digit of the year, here 1996



RIGOROUS FUNCTION AND RELIABILITY TESTS

VISUAL INSPECTIONS AT HIGH PRECISION

Literature


OKI
GSM SAW Filter
nX Microcontroller
4-Bit nX-4 Microcontroller
Voice CODEC LSI Family
Gallium Arsenide Products
MSM7712 (.XI) Wireless LAN Baseband Controller
Speech LSI Products

PRODUCT BROCHURES

- OKI ELECTRIC EUROPE COMPANY PROFILE
- SEMICONDUCTOR SHORTFORM
- nX ORIGINAL MICROCONTROLLER
- 4-BIT nX MICROCONTROLLER
- ADPCM SPEECH LSI PRODUCTS
- VOICE CODEC FAMILY
- FRAM/VRAM PRODUCTS
- DISPLAY DRIVER PRODUCTS
- GALLIUM ARSENIDE PRODUCTS
- WLAN BASEBAND CONTROLLER (.XI)
- VOICE RECOGNITION PROCESSOR
- FM MULTIPLEX DEMODULATOR
- MSM83C154 INDUSTRY MCU
- IC CARD MCUs
- OPTICAL MOS RELAYS
- GSM SAW FILTERS
- IC PACKAGING GUIDE

OKI
'96 Data Book for TELECOM LSI (CODEC)
'95 Data Book for VOICE SYNTHESIZERS(½)
'95 Data Book for VOICE SYNTHESIZERS(½)
'95 Data Book for MICROCONTROLLER (8/16-Bit)
'96 Data Book for TELECOM LSI (MODEM/OTHERS)
'95 Data Book for GaAs DEVICES
'94 Data Book for MEMORY LSI (16M DRAM)

DATA BOOKS

- MICROCONTROLLER (4-BIT)
- MICROPROCESSOR (8-BIT/16-BIT)
- USER MANUALS FOR MICROCONTROLLER
- LCD DRIVER & CONTROLLER
- VF DRIVER & CONTROLLER
- VOICE LSI (Detail and Digest Version)
- REAL-TIME CLOCK DATA BOOK
- TELECOM LSI (CODEC)
- TELECOM LSI (MODEM/OTHERS)
- GATE ARRAY
- MEMORY (1 to 16MBit DRAM)
- MEMORY (64-MBit DRAM/SDRAM/RDRAM)
- MEMORY MODULE
- MEMORY (ROM/OTP)
- MEMORY (SRAM/ASM)
- GaAs DEVICES
- PACKAGE INFORMATION
- QUALITY & RELIABILITY HANDBOOK
- FIBER OPTIC
- OPTO-ELECTRONIC DEVICES

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Notice

IMPORTANT NOTICE

Please observe the following handling and application rules regarding all OKI IC-products regardless of how they are packed:

- For handling use experienced personnel only.
- Handle with utmost care, do not toss or drop.
- Avoid electro-static discharge.
- Do not touch IC leads with bare hands.
- Do not bend leads.
- Do not expose to direct sunlight and humidity.
- Use adequate tools whenever the OKI products are handled or assembled.
- Handle and assemble with suitable clothing under laboratory conditions in OKI-recommended climate.
- Use only OKI-recommended soldering methods and temperature profiles.
- If products need to be temperature baked, use suitable equipment and heat proof carriers, only.
- Make sure to refer to the latest valid documentation supplied by OKI for the products concerned.
- Do not reuse any packaging materials.
- If in doubt, contact OKI prior to any further action.

OKI does not assume any responsibility for the consequences of improper handling or operation. OKI shall not be liable for any use or application. The customer acts on his own responsibility and shall himself make sure not to infringe any third party rights in using the product. Certain products described herein fall within the category of strategic goods, etc. under Foreign Trade Control Law. Accordingly, before exporting such products, you are required to file an application for export licence with your Government authorities.

For product availability details, please be so kind as to contact your nearest **OKI** representative. The information in this brochure merely contains a general product description. It is not the final product data sheet. This issue substitutes and supersedes all semiconductor shortform catalogues previously supplied by **OKI ELECTRIC EUROPE GmbH.**

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